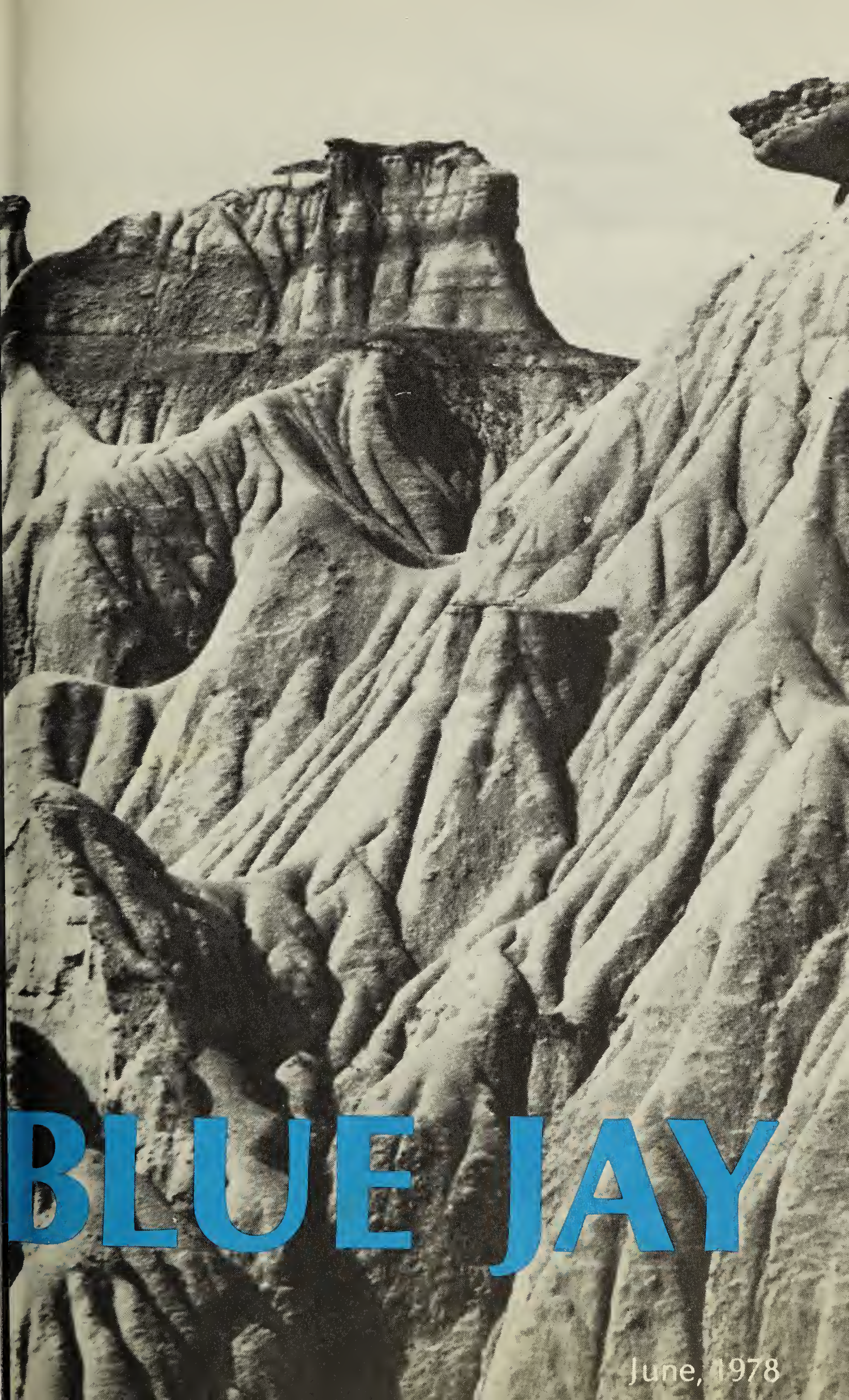
University of Alberta Library
0 1620 1670 0823

A32501

Digitized by the Internet Archive
in 2019 with funding from
University of Alberta Libraries

https://archive.org/details/bluejay362sask



BLUE JAY

June, 1978

A JOURNAL OF NATURAL HISTORY AND CONSERVATION
FOR SASKATCHEWAN AND ADJACENT REGIONS.

FOUNDED IN 1942 BY ISABEL M. PRIESTLY

Published quarterly by the Saskatchewan Natural History Society, Box 178
Saskatoon, Saskatchewan S7K 3S1. CN ISSN 0006-5099.

Editor: Gary W. Seib, 2325 Cornwall St., Regina S4P 2L4 Tel. (306) 523-7323.

Associate Editors: Margaret Belcher, J. Bernard Gollop, George F. Ledingham.

Editorial Assistants: Georgina Jackson, Shirley Jowsey, Barbara Shourouni
JoAnn Skenderovich.

Circulation: Jim Mundy.

All items for publication should be addressed to the editor at 2325 Cornwa
Street, Regina, Saskatchewan S4P 2L4. Deadline for material to be considered f
the September issue is July 20, 1978.

SUBSCRIPTIONS-MEMBERSHIPS: Send all renewals, new memberships ar
correspondence concerning changes to address to the TREASURER, SNHS, BC
1784, SASKATOON, SASKATCHEWAN S7K 3S1.

The classes of membership in the Society are as follows: Regular $5.0
Sustaining $10.00; Patron $25.00. Sustaining and Patron memberships include t
regular fee plus a donation for which a receipt is available for income tax pu
poses, upon request. Bulk orders (minimum of five to one address) are availab
to junior club members and to educational institutions at the rate of $5.00 for t
first subscription and $2.00 for each additional one.

REPRINTS: Requests for quantities of reprints of any article in the *Blue J*
should be sent to Centax of Canada, 1440 Scarth Street, Regina, Saskatchew
within one month of publication. Contributions wishing a few extra copies of t
current *Blue Jay* may get them at cost. Requests for these should be made to t
Editor when material is submitted for publication.

Any material printed for the first time in the *Blue Jay* may be reproduc
without permission. Credit lines will be appreciated. Use of photographs requir
written permission from the photographer.

Cover: *Dinosaur Provincial Park, Alberta. Wayne Lynch.*

BLUE JAY

Vol. 36, No. 2 June 1978 Pages 65-128

THE MYTH OF THE NON-CONSUMPTIVE USER. *Brian Wilkes* 67

Plants

THE NATIVE CARNIVOROUS PLANTS OF SASKATCHEWAN. *Vernon L. Harms* 71

THE HOLY FERN IN ALBERTA. *D. F. Brunton* 82

Insects

AS THE WORM TURNS. *Gordon J. Smith* 84

Fish

FINESCALE DACE IN SASKATCHEWAN. *Jeaniene Smith* 86

Reptiles

THE EASTERN YELLOW-BELLIED RACER IN CANADA. *K. J. Finley* and *M. A. Jasieniuk* 88

DEATH-FEIGNING IN THE EASTERN YELLOW-BELLIED RACER. *Wayne Lynch* 92

OBSERVATIONS OF AN EASTERN YELLOW-BELLIED RACER IN CAPTIVITY. *Robert Kreba* 94

Birds

ARRIVAL OF THE HOUSE SPARROW ON THE PRAIRIES. *C. Stuart Houston* 99

THE BIRDS OF DINOSAUR PROVINCIAL PARK, ALBERTA. *Norbert G. Kondla* 103

1977 BIRD OBSERVATIONS IN THE CARIBOU MOUNTAINS, ALBERTA. *E. Otto Hohn* and *D. V. Weseloh* 115

PINTAIL PARASITIZING SNOW GOOSE NEST. *R. R. Campbell* and *E. Boorman* 116

MID-MARCH SINGING BY AMERICAN ROBIN AND VARIED THRUSH IN SOUTHWESTERN ALBERTA. *Martin K. McNicholl* 118

VARIATIONS IN BIRD NESTING HABITS. *Jean Bancroft* 120

ERRATTA AND ADDENDA — SASKATCHEWAN CHRISTMAS BIRD COUNTS: A 35-YEAR REVIEW (PART 1). *Wayne E. Renaud* and *Guy J. Wapple* 121

RECOVERY OF BANDED PERIGRINE FALCON. *S. O. Jordheim* 121

LARGE CONCENTRATION OF COMMON NIGHTHAWKS. *Ken de Graff* . 122

WHITE-FACED IBIS AND CATTLE EGRET AT LITTLE QUILL LAKE. *J. B. Gollop* 122

WHITE-FACED IBIS AT LAST MOUNTAIN LAKE, SASKATCHEWAN. *E. M. Callin* 123

COLOUR-MARKED PURPLE MARTINS 123

Nature Library

CAREX IN SASKATCHEWAN. Reviewed by *G. F. Ledingham* 124

HOW TO CONTROL GARDEN PESTS WITHOUT KILLING ALMOST EVERYTHING ELSE. Reviewed by *Margaret Belcher* 125

Letters

YOU'RE NEVER TOO OLD! *Mrs. Harold J. Bray* 126

BIRD FEEDING TRAY AT FENTON. *Mrs. Elsie V. Weegar* 126

1931 MAGPIES. *Hans de Vogel* 126

BONAPARTE'S GULL AT McOUAT LAKE. *Larry Morgotch* 127

NOISY NIGHT FLIGHT OF CROWS. *Patricia O'Neil* 127

MARKED WHOOPING CRANE. *Hans de Vogel*. 128

NEW MAGAZINE. *Bob Gibson* 128

TRUMPETER SWAN SOCIETY CONFERENCE 128

CORRECTION 128

THE MYTH OF THE NON-CONSUMPTIVE USER

RIAN WILKES, Nanaimo Naturalist Club, Box 125, Nanaimo, British Columbia V9R 5K4

DITOR'S NOTE: This ariticle has een condensed from the October-ecember 1977 issue (Vol. 91, No. 4) of e Canadian Field-Naturalist.

It is easy to understand why ecreational hunting and fishing are onsidered consumptive. Living rganisms are physically removed om the scene, and consequeces are pparent when populations of game ecline. Certain conservation groups r individuals in them often rail gainst consumptive forms of ecreation. Other groups recognize nd accept the consumptive nature of eir activity, arguing that they merely op off some sort of "harvestable rplus." Rod and gun clubs, rifle ssociations and other groups are in is category. No matter what one's rticular attitude toward hunting and shing is, there is general agreement at these are consumptive activites. hey are closely regulated in terms of g limits or in the number of licensed rticipants. These controls derive om the recognition of the conmptive nature of the acitivity and e constant with conventional anagement techniques.

By contrast, hiking or back-packing, ghtseeing, general tourism and mping in parks, nature study, nature otography, and picnicking are early regarded as *non-consumptive* the resource base. These activities not seem to remove living ganisms from the scene. They are garded as healthful pursuits that are nign in terms of the surrounding ndscape. Participants in these acities are regarded as non-nsumptive users of outdoor creation resources, and consequently there are few controls governing their numbers or behavior.

No one can possibly guess the total number of people who visit unorganized facilities. The point is that non-consumptive users are present in far greater numbers than consumptive users. For example, in 1975, the number of hunters and anglers in British Columbia was about 512,000. No figures are avialable for the numbers of hunter or angler days for that year, but they could not possibly approach the 8.7 million day and overnight visits to provincial parks in British Columia for the same year. In addition, the British Columbia Forest Service provides unsupervised camping facilities throughout the province, and cannot estimate the number of people who use them. Both Crown Zellerbach and MacMillan Bloedel who provide limited facilities in their timber limits estimate the yearly visitation to be in the tens of thousands.

These are estimates for British Columbia alone, with a population of 2.5 million. We would surmise that the total number of "non-consumers" ranging across the landscape of all provinces and territories is staggering. They have become big business, and a big problem.

The concept of the non-consumptive user of outdoor recreation resources is false. Because the notion of the non-consumptive user has been so widely accepted, many serious errors have been made in land-use planning and in the philosophy of the conservation movement. Here is a case in which a comfortable myth has been applied as a principle of land use, and as a result some of the major objectives of the conservation movement are in jeopardy.

If so-called non-consumptive activities are not so benign, then we had better acknowledge this and get down to the serious business of reassessing our priorities. One of the major objectives of the conservation movement is the preservation of natural landscapes and habitats. We have focused on gaining legislative protection for them without very seriously addressing the question of what happens to them next. In fact, the chief argument used in support of natural area preservation, except ecological reserves, is the benefit that supposedly accrues to the public in terms of recreation.

Non-consumptive users do consume recreation resources along spatial, visual, and physical dimensions. They trample and rearrange vegetation patterns, disturb wildlife, and are the chief distributors of refuse across the land.

Spatial consumption simply means recreation consumes space. In a small park like Ivy Green Provincial Park, south of Nanaimo on Vancouver Island (62 acres), the act of providing for the accommodation of non-consumptive users has succeeded in directly consuming three-quarters of the habitat, and this in a park which has statutory protection from impairment. In this example, the visitors do not directly remove organisms from the scene. The government does it for them, with our blessings.

Visual consumption means that large numbers of people consume solitude. Crowds in any particular area can build to the point where the scenic amenities of the site are completety lost by the presence of too many people.

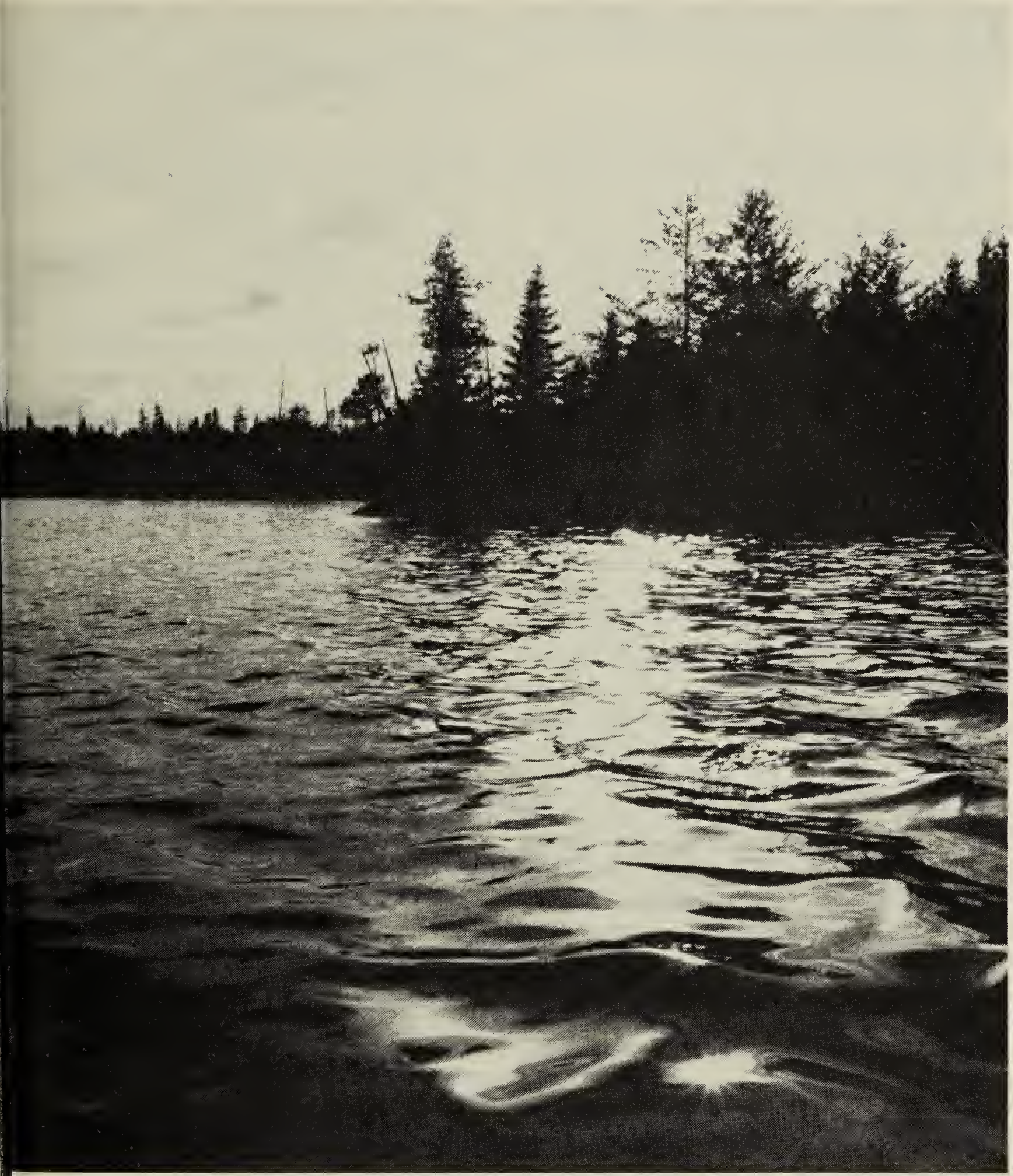
Another aspect of visual consumption is the visual impact humans have on wildlife. There are a number of wildlife species that seem to require privacy from human intrusion in order to thrive in their respective ecosystems. In these cases the presence of people may not be directly consumptive, but in the long run the result is the same.

Beyond requirements for access and accommodation on recreational landscapes lies the problem of direct physical impact. Studies have shown that in certain environments, such as forested area with a well-developed ground cover, very severe impacts occur with the lightest use, and that physical impact is cumulative over a period of time. Even light and occasional use of an area for hiking or nature study can have its effect in time.

The direct crushing of vegetation by trampling is one factor that favors the replacement of natural vegetation by non-native basal rosette-type plants such as plantain or hawkweed. Soi compaction caused by human treading retards the growth of trees, perhaps killing them. Forest duff can be pulverized, the soil denuded, the ground can become puddled and down-slope erosion can occur. The long-term effects of these impacts are visibly and seriously to alter the original vegetation patterns and associations in a manner that norma plant succession would not. Furthermore, wildlife that requires specia vegetational habits will be affected.

Members of naturalist clubs are often the worst offenders in unique o highly sensitive habitats. These are areas we actively seek because of thei high interest value. We tramp around in bogs, marshes, alpine meadows, and gull colonies, content in our non-consumptive status. Increasing numbers of natural food buffs are systematically harvesting edible wild nature.

The accumulation of garbage and



remote northern lake *Wayne Lynch*

tter in remote places is a very serious roblem. Tons and tons of it are auled out of our remote and ac- ssible recreation areas every year. nagine the garbage that piles up in e well known and easily reached eas. Garbage is not only unsightly, its esence can alter natural behavior tterns in some species of wildlife.

Not only is it necessary to remove rtions of the original countryside initially to accommodate the non-consumers, but the impact that these users have on the remainder continues year after year to erode the landscape more. The massive numbers of such users, doing their collective "thing" on our natural landscapes, makes them (i.e., us!) the *most* destructive of all groups of recreationists. So we are faced with an interesting irony: the "non-consumers" are shown to be the most serious consumers, simply by virtue of their numbers, by what they do, and where they do it.

We must accept that the notion of non-consumptive use is a myth. There is simply no such thing as a non-consumptive user.

At least three implications come to mind if we are to reject the idea of non-consumptive users. We must construct strict rules guiding our behavior when visiting natural landscapes. We must adopt a new attitude and approach to land-use planning as it applies to recreational landscapes.

We would recommend that clubs make an effort to travel to special spots only very occasionally; and when they do, they should travel in small groups. Choose places to go at a time of year when you'll do the least damage, and then stay on established pathways in small groups. Identify plants where they are without picking bits off to check at home. We know a few "naturalists" who crash around looking for bird nests, and photographers who tear away the foliage for the proper camera angle.

Controls on behavior extend from the voluntary action of clubs to the mandatory restrictions of government agencies. Strict visitor controls appropriate in large parks include party size limits, the use of burnable containers only, and the use of stoves rather than fires where natural wood is at a premium. The ideal situation would entail licensing all back-country users and regulating their numbers through a permit system. The licensing procedure has a double benefit. It allows agencies to know how many users there are, and it could mean a skills test prior to licensing. A skills test is very important because ignorant and unskilled people are using natural landscapes more and more, and they do the most damage.

If we reject the idea of the non consumptive user, and yet recognize the importance of landscape preservation, we can hardly endorse parks as the appropriate vehicle fo preservation, because parks are justified and developed for thei recreation potential.

This does not mean we should rejec the idea of parks, but rather encourage governments to become serious abou their stated purpose of preservin unimpaired landscapes. Neithe should we reject the idea of people i parks, because there are regulator mechanisms available to limi resource consumption by tourists an others. But we must dismiss the ide that landscapes, and the communitie of life on them, can only be preserve in parks, and that the rationale o preservation is recreation.

We should hold that the landscape and their internal dynamics should b preserved solely because they ar there, for their own sake, and becaus they have a right to exist. If w recognize the consumptive nature o all recreational land uses, and ar really concerned about landscap preservation, then we should reje conventional land-use planning favor of *non*-use planning.

A new theory of non-use plannin can be generated from a thoroug understanding of the nature resource consumption b recreationists. It would involve th identification of physical carryin capacities on natural landscapes. would centre around strict controls o the numbers and behavior of pa ticipants in supposedly no consumptive pursuits. It would pla preservation as the top priority inste of use. Finally, it would emphasize th non-human nature exists for its ov sake, and that the accommodation people in it is not a matter of co promise but rather one of integration

THE NATIVE CARNIVOROUS PLANTS OF SASKATCHEWAN

VERNON L. HARMS, Fraser Herbarium, Dept. of Plant Ecology, University of Saskatchewan, Saskatoon

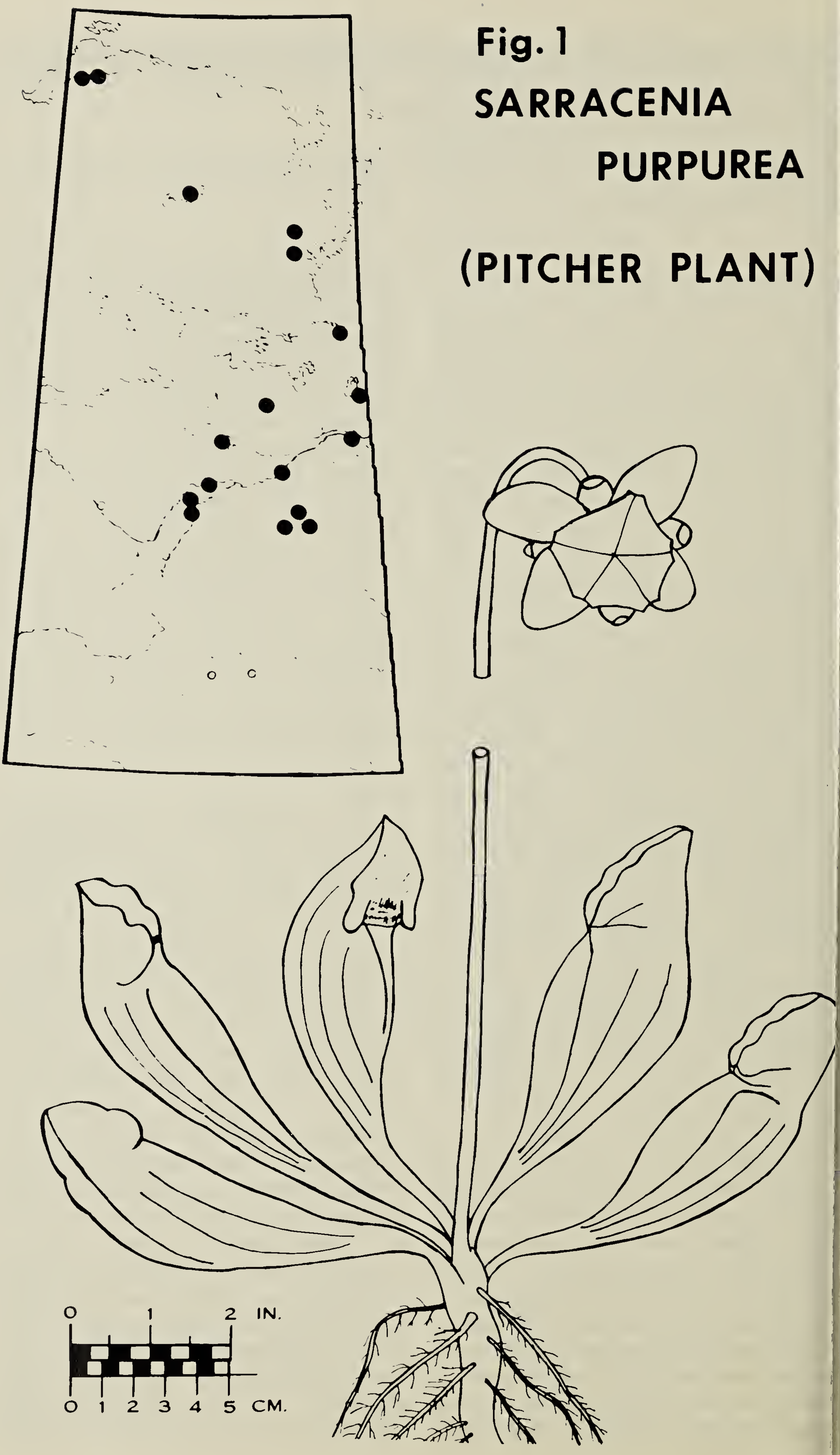
Particularly fascinating for many naturalists and botanists are the so-called "carnivorous" or "insectivorous" plants. These anomalous plants have evolved the "unplant-like" capability of feeding directly on animal life. Such plants are more accurately termed "carnivorous" than "insectivorous", since their "animal diet" may not be restricted to insects alone, and even organic plant materials such as pollen grains may be passively trapped and digested. However, it should be noted that all Saskatchewan carnivorous plants still photosynthesize their food, as do other green plants, and the carnivorous habit merely supplements their nutrient intake. It is likely not accidental that most carnivorous plants are inhabitants of bog or fen peatlands, or of other wet areas often of high osmotic concentrations where the availability of nutrients such as nitrogen or phosophorus may be reduced for the plants. Carnivorous plant groups occur in various unrelated orders of flowering plants and differ considerably in their mechanisms of animal entrapment and digestion. Thus, the carnivorous habit must have evolved independently in most of these.

The reader is referred to such vailable informative publications as loyd, Schell, and Heslop-Harrison which describe carnivorous plants in detail and probe their unique mechanisms of animal-feeding.[5] [7] [4] The objective of the present article is to aid naturalists and other interested ersons in becoming more familiar with those carnivorous plants that are ative to this province and more knowledgeable about where to look for them. Brief general descriptions of the characteristics of each genus and keys to the included species are given to facilitate their identification. Also to aid in their recognition, drawings of each of our ten carnivorous plant species have been sketched. The Saskatchewan distribution maps show the known documented distribution of each species in the province as represented by voucher specimens filed in the Fraser Herbarium or from literature reports. These maps may reflect the distribution of collectors more than of the actual distribution of the species, since collecting has been far from uniform or random.

The ten species of native carnivorous plants in Saskatchewan belong to four genera: *Sarracenia* (pitcher plants), *Drosera* (sundews), *Utricularia* (bladderworts), and *Pinguicula* (butterworts). Each of these four genera has evolved unique structures and methods for insect entrapment and digestion. The bladderworts are aquatic while most other carnivorous plant species are terrestrial in moist to wet bogs, fens, or mossy shorelines. Of the ten native carnivorous plant species, at least three appear to represent distinctly rare and possibly endangered species in Saskatchewan; these are the narrow-leaved sundew, horned bladderwort, and hairy butterwort. Four additional species — the pitcher plant, oblong-leaved sundew, common butterwort, and lesser bladderwort — are somewhat more frequent and may sometimes occur in

Fig. 1
SARRACENIA PURPUREA

(PITCHER PLANT)


0 1 2 IN.
0 1 2 3 4 5 CM.

fairly large local populations, but appear quite sporadic in their Saskatchewan distribution. At least the common butterwort and lesser bladderwort appear borderline for possible consideration as rare and potentially endangered species. Only three carnivorous plant species are quite common and widespread in Saskatchewan; these are the round-leaved sundew, common bladderwort, and flat-leaved bladderwort.

The PITCHER PLANT *(Sarracenia purpurea L.)* is the largest and showiest of our carnivorous plant species (see fig. 1). A solitary, large, nodding, dark purple, fleshy, 5-parted flower with umbrella-like upper styles is borne on a stout leafless flowering-stalk surrounded basally by a rosette of large, unusually modified, hollow, curved, pitcher-shaped, usually red-purple leaves which function as rain-catching receptacles. Insects attracted by the reddish color and nectar secreted by the leaves will be guided along a nectar strip until they slide down the slippery inner surfaces that are covered with downward-pointing hairs, becoming trapped in the "pitchers" which are half filled with liquid. The trapped victim is apparently digested by plant-secreted enzymes and by simple bacterial decomposition, and the plant will subsequently absorb nutrients from this broth. Almost paradoxically, one nsect, a minute mosquito species, not only can tolerate them, but actually depends upon the pitchers for breeding, with its larvae later feeding on the organic residues contained in them.

Our pitcher plants occur in bogs, sometimes forming large colonies. Apparently they are quite sporadically distributed in the more southern boreal forest region, mainly in the eastern half of Saskatchewan (see map 1). Although hardly representing a truly rare or endangered species in Saskatchewan, the future of pitcher plants in the province does depend upon the future nonalteration of their various local bog habitats.

The SUNDEWS *(Drosera* spp.) are evolutionarily related to the pitcher plants and are classified in the same taxonomic order, although in a different family. However, their mechanisms of insect entrapment are quite different. In the sundews, the small, white-(or pink) — petalled flowers are borne in uncoiling raceme-like inflorescences borne upon very slender, leafless flowering stalks. These are surrounded basally by a rosette of usually long-stalked leaves, the blades of which are densely covered with globular-tipped hairs exuding a viscid fluid to which the insect prey adheres, as well as enzymes to digest the prey. While the primary entrapment method appears simply to be the insect's adhesion to the initially touched viscid glands, neighboring stalked glands also slowly curve inward and downward to contact and enmesh the prey, trapping it even more completely. Perhaps the latter actually function more effectively for hastening the digestion process than for entrapment itself, since the response would seem unduly slow for the latter.

There are three *Drosera* (sundew) species in Saskatchewan, and these may be distinguished by means of the following identification key:

1. Leaf blades inverted-triangular to nearly circular in outline, over 5 mm broad, less than 10 mm long, as broad as or somewhat broader than long, much shorter than the hairy leaf-stalks; the leaves ± horizontally spreading; seeds spindle-shaped with both ends prolonged *D. rotundifolia*

1. Leaf blades linear to spatula-shaped or

narrow egg-shaped, gradually tapering below to leaf stalk, less than 5 mm broad, over 1 cm long, much longer than broad; leaf stalks not hairy, either longer or shorter than the blades; the leaves ± erect to only slightly spreading.

2. Leaf blades 2.5-5 mm broad, 1-3 cm long, usually much shorter than the leaf stalks, spatulate, oblong, lance, or narrowly egg-shaped; seeds spindle-shaped with both ends prolonged *D. anglica*

2. Leaf blades linear, nowhere more than 2.5 (-3) mm broad, 2-6 cm. long, usually longer than the leaf stalks; seeds rhomboidal without prolonged ends *D. linearis*

The ROUND-LEAVED SUNDEW *(Drosera rotundifolia L.)* is probably our most common carnivorous plant, being nearly ubiquitous on sphagnum moss, especially in bogs, but also in fens, wet black spruce forests, and on "boggy" lake shores (see fig. 2 and map 2).

The OBLONG-LEAVED SUNDEW *(Drosera anglica* Hudson) is a sporadically occurring species in Saskatchewan, recorded most often in very wet, high-mineral, calcareous, "boggy" fens; or on wet mossy or marshy quiet shores, apparently throughout the boreal forest region of the province. Local populations may be large or small. (See fig. 3 and map 3).

The NARROW-LEAVED SUNDEW *(Drosera linearis* Goldie) is apparently a very rare species in Saskatchewan, known only from Prince Albert [W. P. Fraser 12/7/33 (SASK 12947); 5/8/33(SASK 12952)], McKague [A. J. Breitung 10/8/34(SASK 12950, 124951)] and Garthland [J. H. Hudson #2958(SASK 54271)], where it occurred in high-mineral calcareous "bogs". (see fig. 4 and map 4).

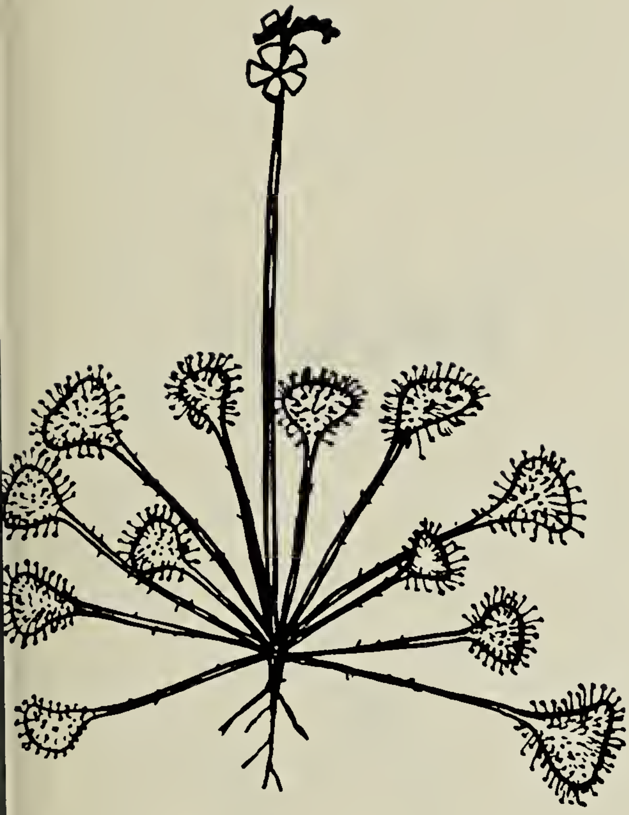
The BLADDERWORTS *(Utricularia* spp.) are evolutionarily related to, and are probably a derivative line from, the figwort family (Scrophulariaceae). The figwort family also shows a nutritionally-related evolutionary trend toward parasitism in some other groups. The bladderworts are true aquatic plants, rooted to the bottom and entirely submerged, except for the emergent racemes bearing conspicuous, yellow, spurred, "scroph-like" flowers. The leaves are finely dissected and forked one to several times into narrow linear or thread-like segments. Borne on the leaves are small (v5 mm wide), elastic-walled bladders which represent the traps for small aquatic animals. These bladders display an effective, active rather than passive, entrapment mechanism consisting of touch-sensitive hairs at the bladder-mouth which trigger an opening and rapid expansion of the initially flat bladders to suck the prey inside where secreted enzymes will digest it. Since the bladders are small (0.5-5.0 mm wide), the animals primarily captured are small crustaceans, rotifers, aquatic insect larvae, and protozoans.

There are four *Utricularia* (bladderwort) species known from Saskatchewan which may be distinguished by means of the following identification key:

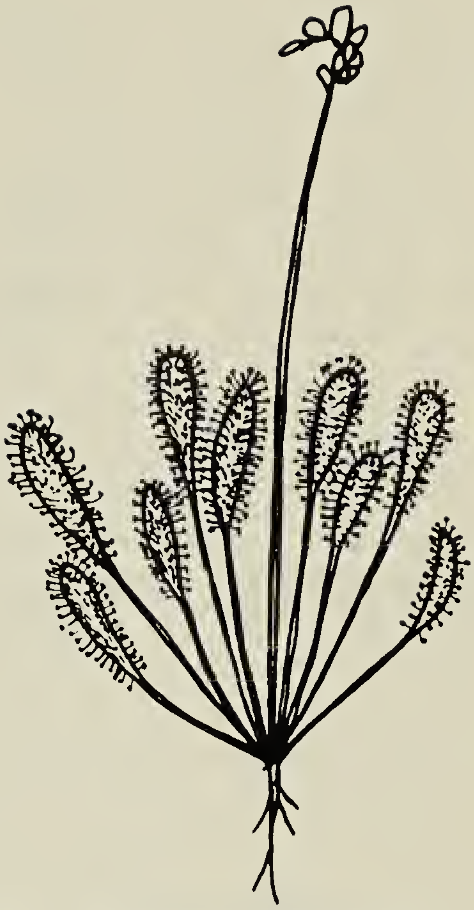
1. Plants of very shallow water, much reduced to a short, essentially leafless and bladderless flowering stem, but the stem base and short root branches bearing some thread-like leaves and a few bladders; bladders minute, 1 mm wide or less; flowers large and conspicuous, 1-3 closely spaced along short raceme, the corollas including spurs 15-20 mm long *U. cornuta*

1. Plants somewhat to much larger, more conspicuous, with stems distinctly leafy; bladders larger, borne on leaves and/or stems.

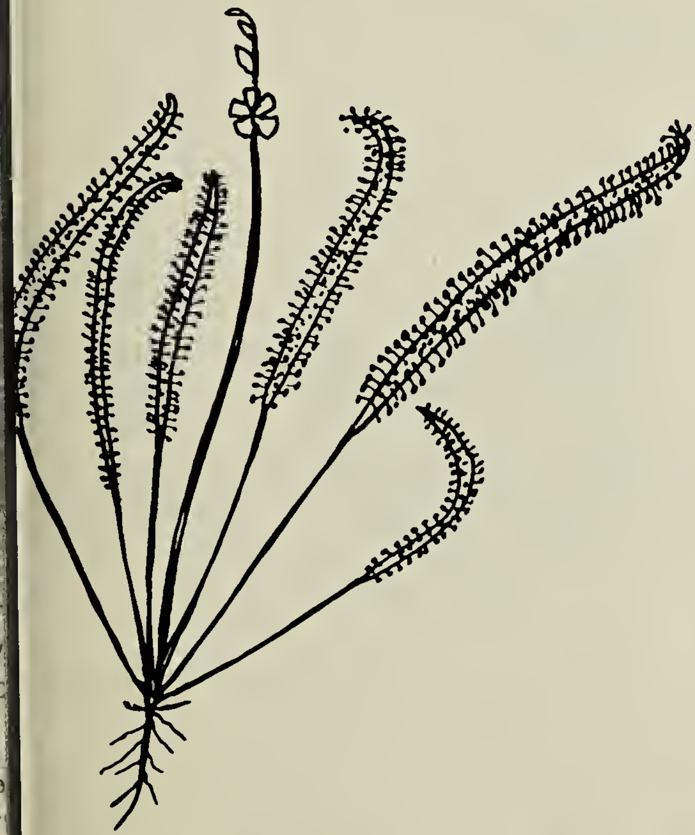
    2. Bladders borne on separate, elongate, leafless branches; plants small, submerged, usually horizontally creeping on bottom in shallow water less than 2 dm deep and rooting at nodes; leafy shoots



2. DROSERA
ROTUNDIFOLIA

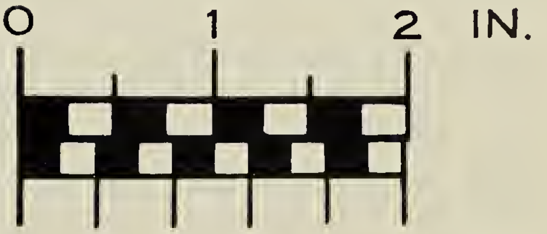


3. DROSERA
ANGLICA

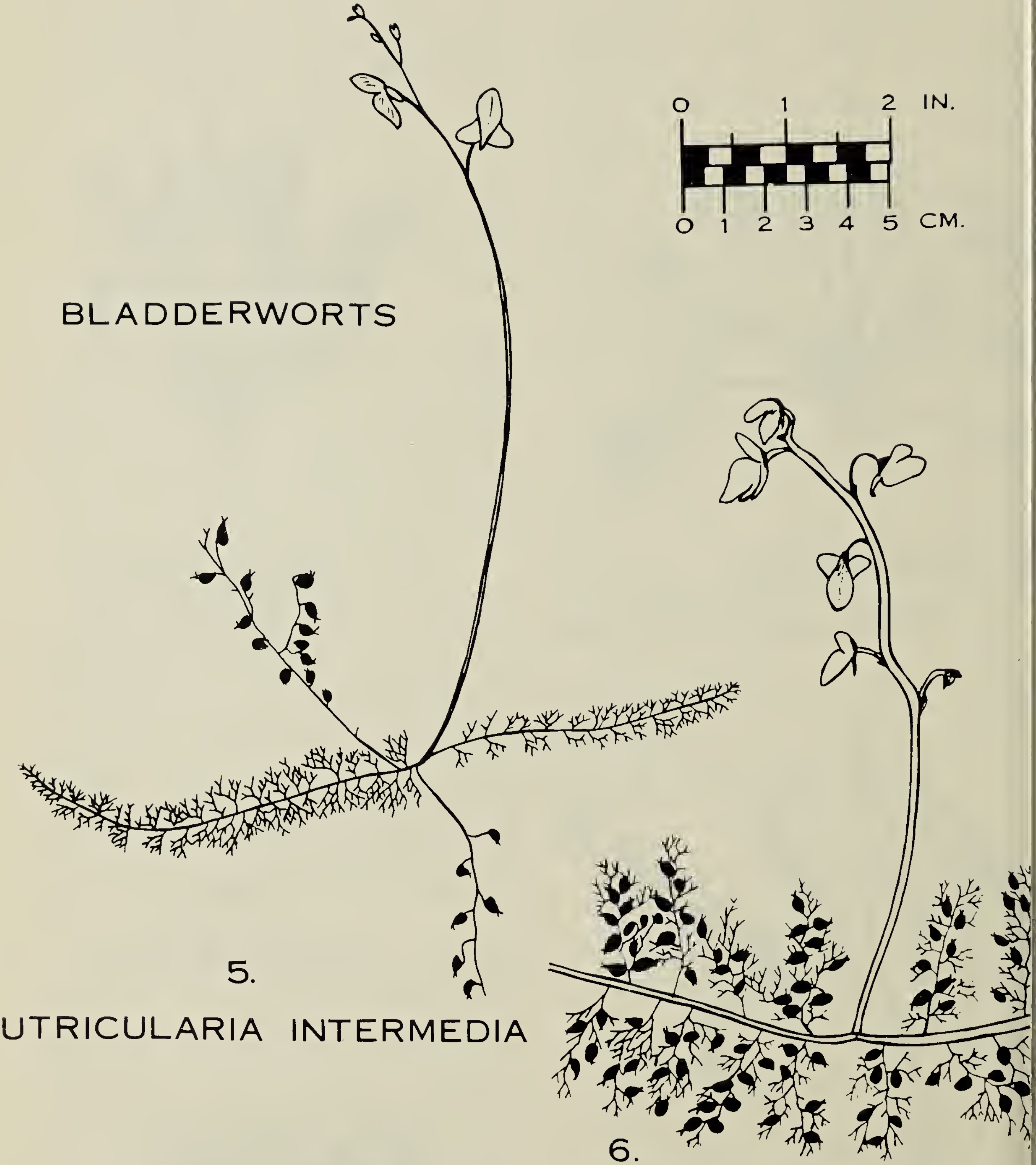


DROSERA LINEARIS

THE SUNDEWS



BLADDERWORTS


0 1 2 IN.
0 1 2 3 4 5 CM.

5.
UTRICULARIA INTERMEDIA

6.
UTRICULARIA VULGA

mostly less than 2 cm wide; stems slender, less than 0.5 mm thick; leaves less that 1 cm long, the leaf segments linear, 0.2-0.5 mm wide, distinctly flattened, with obtuse and minutely toothed tips; corollas including spurs 10-15 mm long; fruiting pedicels erect; winter-buds pubescent, 3-10 (-14) mm long *U. intermedia*

2. Bladders borne on or among leaves or regular leafy stems; ultimate leaf segments acute, not toothed; fruiting pedicels arched-recurved.

3. Plants usually large and coarse, in deeper water to 1 m depths, rooted to bottom at single point, with the numerous branches floating near surface; main leaf shoots mostly over 2 cm wide; stem diameters mostly over 0.5 mm; leaves large, over 1 cm long, crowded, the segments thread-like, round in cross-section; bladders numerous, often large, 2-5 mm wide, borne mostly on leaves; expanded flowering racemes 5-20 cm long; flowers large, with corollas bright yellow, 10-20 mm long including the distinct curved spur; flowering racemes mostly longer, often many-flowered; winter-buds large, 10-20 mm long, compact with crowded, hairy, minute bud-leaves *U. vulgaris*

3. Plants small, delicate, submerged on bottom is shallow water; leafy shoots mostly less than 1 cm wide; stems thread-like, less than 0.5 mm in diameter, less than 25 cm long, only sparsely leafy; leaves shorter than 1 cm, with leaf segments very slender, ± flattened; bladders rather few, 2 mm wide or less; flowers small, with corollas pale yellow, 4-8 mm long, the spurs indistinct, short, rounded; flowering racemes shorter, less than 2 cm long, fewer than 5-flowered; winter buds small, 1.5-5 mm long, more loosely organized, with fewer, glabrous, minute bud-leaves *U. minor*

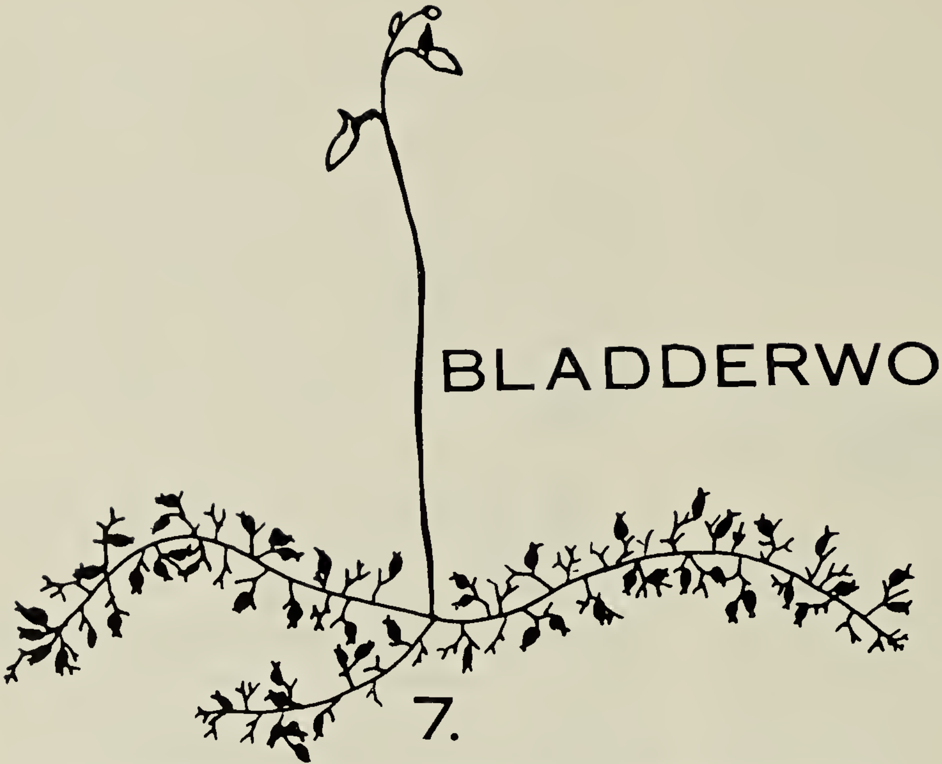
The FLAT-LEAVED BLADDERWORT *Jtricularia intermedia* Hayne) is quite ommon in shallow water less than 2 m deep in bog and fen ponds and off uiet lake shores throughout the oreal forest and parkland regions of Saskatchewan. (See fig. 5 and map 5).

The COMMON or GREATER BLADDERWORT (*Utricularia vulgaris* L. var. *americana* Gray) is another common aquatic species in Saskatchewan, occurring throughout the province, mostly in somewhat deeper water to ½ (-) m depths in lakes, ponds, sluggish streams, and in water-filled depressions in very wet sedge fens. (See fig. 6 and map 6).

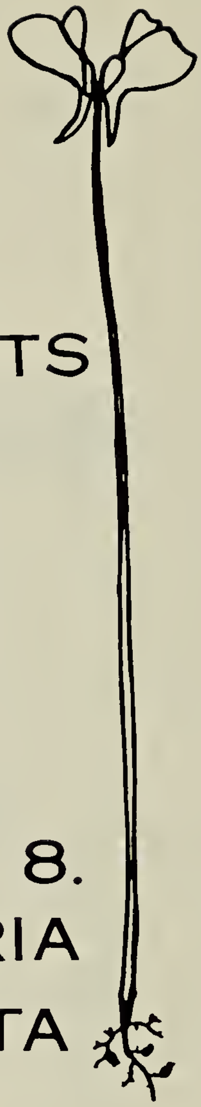
The SMALLER or LESSER BLADDERWORT (*Utricularia minor* L.) has been rather infrequently collected in Saskatchewan and at least formerly was considered a rare and endangered species. Although now recorded from at least 10 scattered general localities in the boreal and parkland regions of the province, the species would appear rare in each location based on present information. However, it may actually be more overlooked than rare, because it apparently flowers only infrequently and is often taken for depauperate specimens of *U. vulgaris*. Our specimen data would indicate that this species is characteristic of very shallow water of quiet shores and water-filled fen depressions, rather than true bogs. (See fig. 7 and map 7).

The HORNED BLADDERWORT (*Utricularia cornuta* (Michx.) is an apparently very rare species in Saskatchewan or at least it has seldom been collected and recorded. Previously it was known only from the south side of Lake Athabasca east of the William River [G. W. Argus #461-62(SASK 30159)], which was the only Saskatchewan record reported by Boivin.[2] Now, thanks to the sharp eyes of my colleague, John H. Hudson, who noted flowering specimens of this species among collections of *U. intermedia,* two more records of *U. cornuta* can be reported for the province. These are: Mile 107.5 of Highway 105 (Wollaston Lake Road) [J. Ternier & M. Jasieniuk #2404 (SASK

BLADDERWORTS



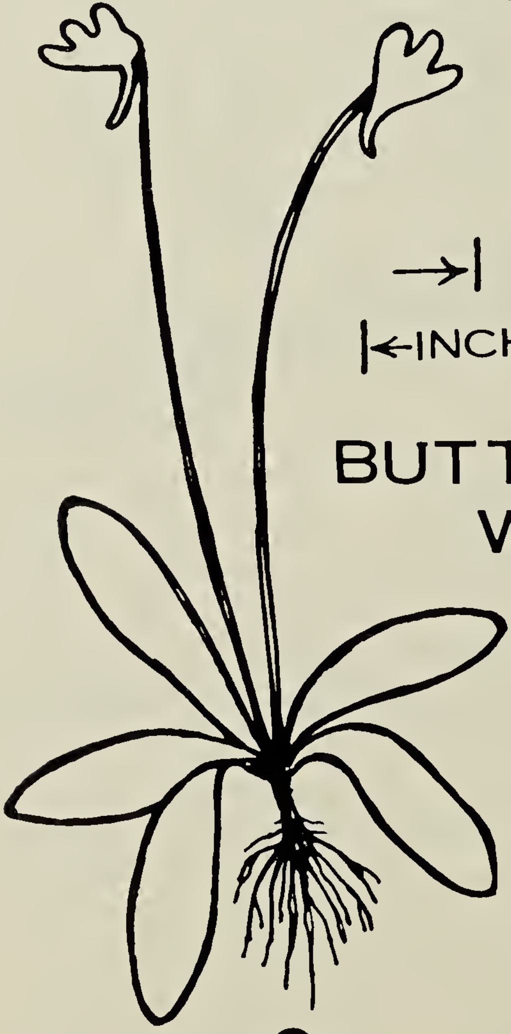
7.
UTRICULARIA MINOR



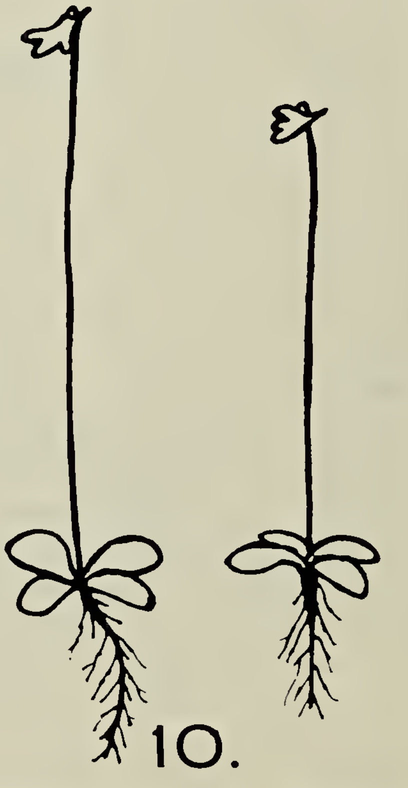
8.
UTRICULARIA
CORNUTA

→| |←CM.
|←INCH→|

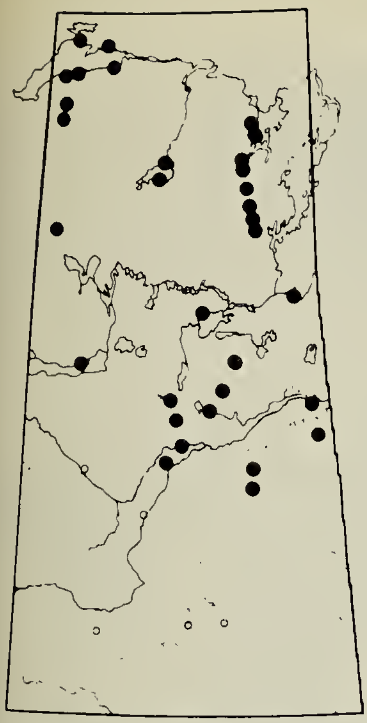
BUTTERWORTS



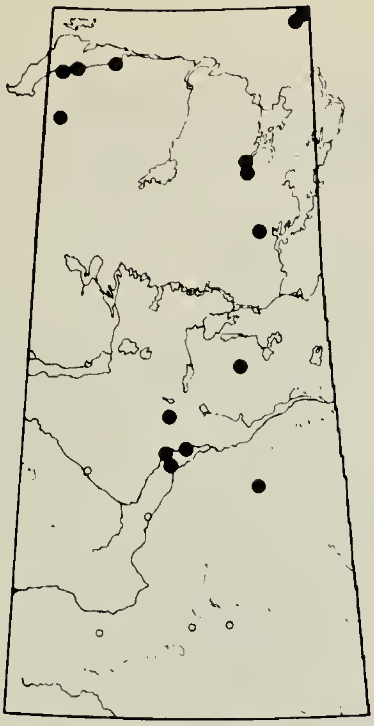
9.
PINGUICULA VULGARIS



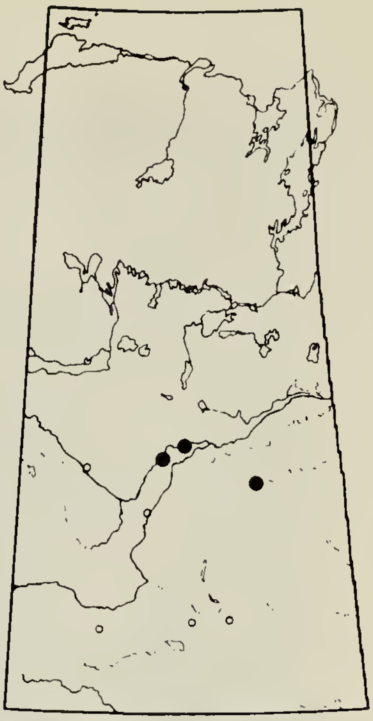
10.
PINGUICULA VILL



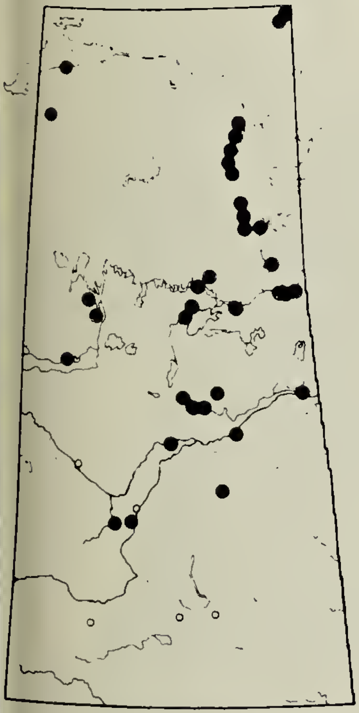
.DROSERA ROTUNDIFOLIA



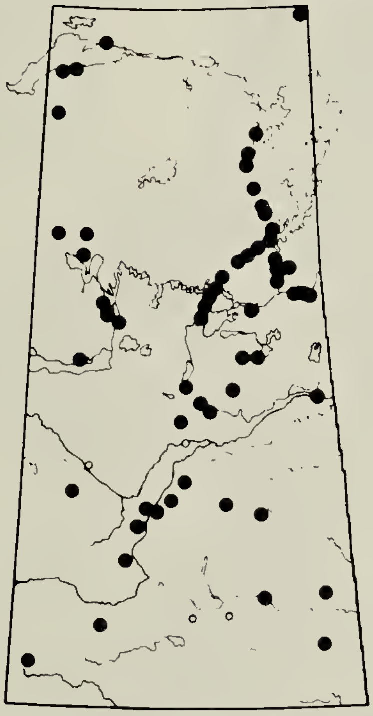
3. DROSERA ANGLICA



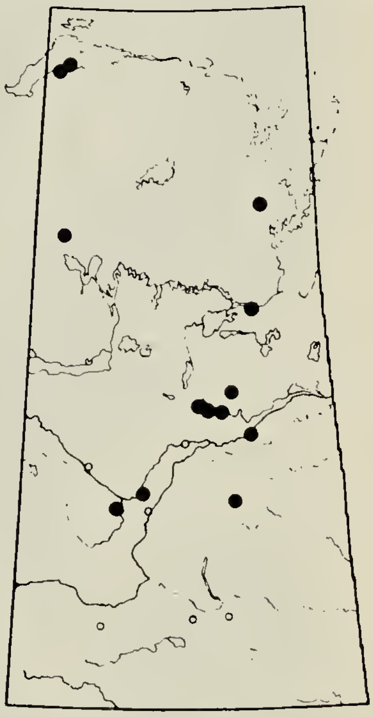
4. DROSERA LINEARIS



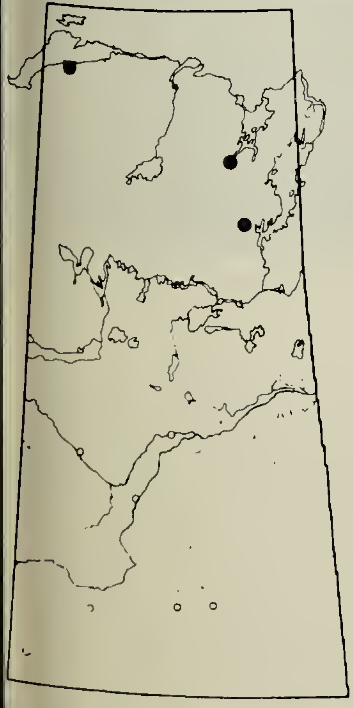
RICULARIA INTERMEDIA



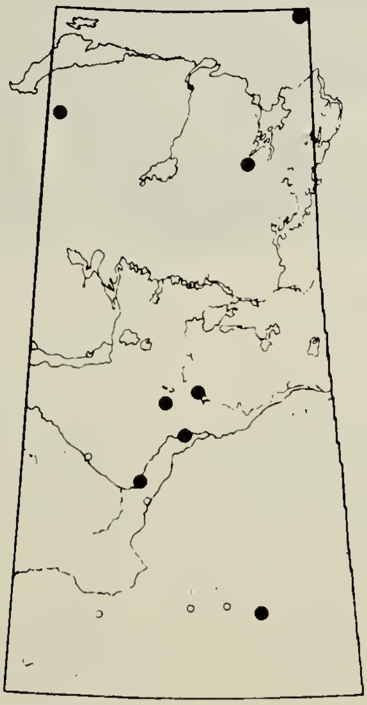
6. UTRICULARIA VULGARIS



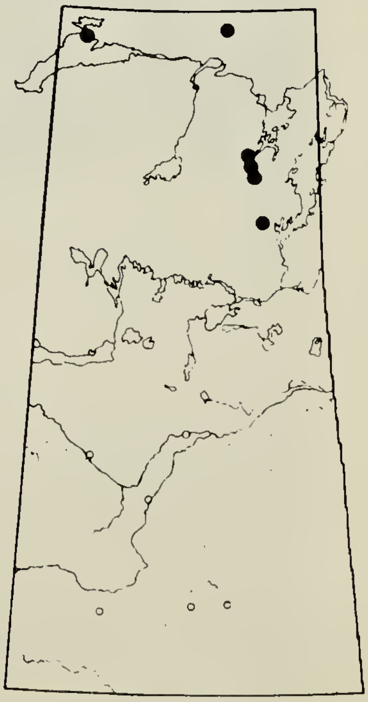
7. UTRICULARIA MINOR



TRICULARIA CORNUTA



9. PINGUICULA VULGARIS



10. PINGUICULA VILLOSA

Sundew and leaves of Pitcher Plant Bob Godw

52748 in part)], and Mile 8 of Highway 105 [J. Ternier & M. Jasieniuk #2230 (SASK 53180 in part)]. The habitat of our recorded material is very shallow water of marshy or "boggy" quiet shores. Lacking its conspicuous flowers, this species would seem almost impossible to notice in a vegetative state. (See fig. 8 and map 8

The BUTTERWORTS or BO VIOLETS *(Pinguicula)* species a closely related to the bladderwo and classified with them in the sa bladderwort family (Lentibulariacea However, their mode of insect e trapment differs markedly from that the bladderworts. The purple violet-like flowers are solitary, each terminating a leafless flower-stalk which arises from the center of a basal rosette of fleshy, elliptical involute, glistening, greasy-viscid leaves which are covered with very small stalked and sessile glands not visible without magnification. These leaves apparently act similarly to "fly-paper" with the stalked glands releasing muscilage when touched, to which the insect adheres. Stimulated by the trapped insect, the sessile glands on the leaf surface then secrete digestive enzymes, which gather in a pool surrounding the prey. Digestion may also be facilitated by the involuted leaf margins.

There are two butterwort *(Pinguicula)* species known in Saskatchewan, which may be distinguished by means of the following identification key:

1. Stems glabrous to sparsely and finely glandular-puberulent throughout; flowers larger, the corollas (12-) 14-17 (-20) mm long including the spur, darker violet-purple; leaf blades 2-4 cm long *P. vulgaris*

1. Stems ± densely short hairy below; flowers small, the corolla 8-10mm long including the spur, pale violet; leaf blades less than 1 cm long *P. villosa*

The COMMON BUTTERWORT or BOG-VIOLET *(Pinguicula vulgaris* L.), belying its name, is hardly common in Saskatchewan, but instead quite sporadic in its occurrence. The species is recorded in the province from only about 10 scattered localities in the boreal forest and parkland regions, and comes close to qualifying as a rare and potentially endangered species in Saskatchewan. Its habitat is that of calcareous "bogs", wet mossy shores, and springy seepages. (See fig. 9 and map 9).

The HAIRY BUTTERWORT or BOG-VIOLET *(Pinguicula villosa* L.) is apparently rare in Saskatchewan where it was reported previously only from the north shore of Lake Athabasca[6] and Offset Lake[8]. In addition to these earlier reports, four new localities for the species have recently been recorded from along the Wollaston Lake Road (Hwy. 105) by the collections of University of Saskatchewan students, Marie Jasieniuk and Judy Ternier. These records, newly reported here, are as follows: Geikie River at the southwestern end of Wollaston Lake [J. Ternier & M. Jasieniuk #2523 (SASK 52754)], 15 miles south of the Geikie River, Mile 100 of Highway 105 [J. Ternier & M. Jasieniuk #1391 (SASK 54670)], Courtney Lake [J. Ternier & M. Jasieniuk #1533 (SASK 52755)], and David Lake west of Reindeer Lake [J. Ternier & M. Jasieniuk #1982 (SASK 52756)]. Its habitat is black spruce or tamarack bogs. (See fig. 10 and map 10).

[1] BOIVIN, B. 1969. Flora of the Prairie Provinces, Part II. Provencheria 3, Universite Laval. 293 pp. (pp. 98-99).

[2] BOIVIN, B. 1972. Flora of the Prairie Provinces, Part III. Provencharia 4, Universite Laval. 140 pp. (pp 347-349).

[3] BREITUNG, A. J. 1957. Annotated catalogue of the vascular flora of Saskatchewan. American Midland Naturalist 58:1-72 (pp. 36-37, 55-56).

[4] HESLOP-HARRISON, Y. 1978. Carnivorous plants. Scientific American 232(2):104-115.

[5] LLOYD, F. E. 1942. The Carnivorous Plants. Chronica Botanica Co., Waltham, Mass.

[6] RAUP, J. M. 1936. Phytogeographic studies in the Athabasca-Great Slave Lake Region. Catalogue of the Vascular Plants. Jour. of the Arnold Arboretum 197:180-315.

[7] SCHELL, D. E. 1977. Carnivorous plants of the United States and Canada. John F. Blair, Winston-Salem, North Carolina.

[8] SCOTTER, G. W. 1961. Botanical collections in the Black Lake region of northern Saskatchewan (1960). Blue Jay 19(1):28-33.

THE HOLLY FERN IN ALBERTA

D. F. BRUNTON, Interpretive Co-ordinator, Kananaskis Provincial Park,
Canmore, Alberta T0L 0M0

In his manual of Alberta flora, Moss describes the Holly fern *(Polystichum lonchitis* (L.) Roth) as occuring in Alberta only at Waterton National Park.[2] Boivin indicates the more general "Southwestern Alberta" for range! The specimens preserved in the University of Alberta and University of Calgary herbaria also support this picture of its distribution.

A number of new stations have been discovered in the last few years which markedly extend the known range of the species northward in the Rocky Mountains of Alberta. Map 1 depicts the range of *P. lonchitis* in Alberta as we now know it.

The map is derived from the following collections and/or observations:

(A) Kananaskis Provincial Park

1. 1976 — Sept. 1 — Burstall Lakes Valley. (W. Nordstrom).
2. 1977 — June 7 — above 2135 m elevation by stream on Mt. Indefatigable. D. Paton 101. (Herbarium of D. Paton).
3. 1977 — June 10 — S. E. — facing avalanche meadow among rocks on Mt. Sarrail above Rawson Lake. ca. 2380 elevation. N. Kondla 1622. (ALTA.).
4. 1977 — July 17 — ENE of summit of Mount Black Prince at 2010 m elevation. (D. F. Brunton and D. Paton).
5. 1977 — Aug. 10 — scattered on slopes west of Lawson Lake, Upper Kananaskis River Valley, from 2320 to 2475 m elevation (D. F. Brunton and D. Paton).

(B) Kananaskis Valley

6. 1977 — July 1 — very common on northeast side of Mt. Inflexible at 2260 m elevation. D. F. Brunton 1395. (DAO)
7. 1974 — Oct. 13 — on steep avalanche slopes above Ribbon Falls, Ribbon Creek. D. Jaques 5086. (University of Calgary).

(C) Banff National Park

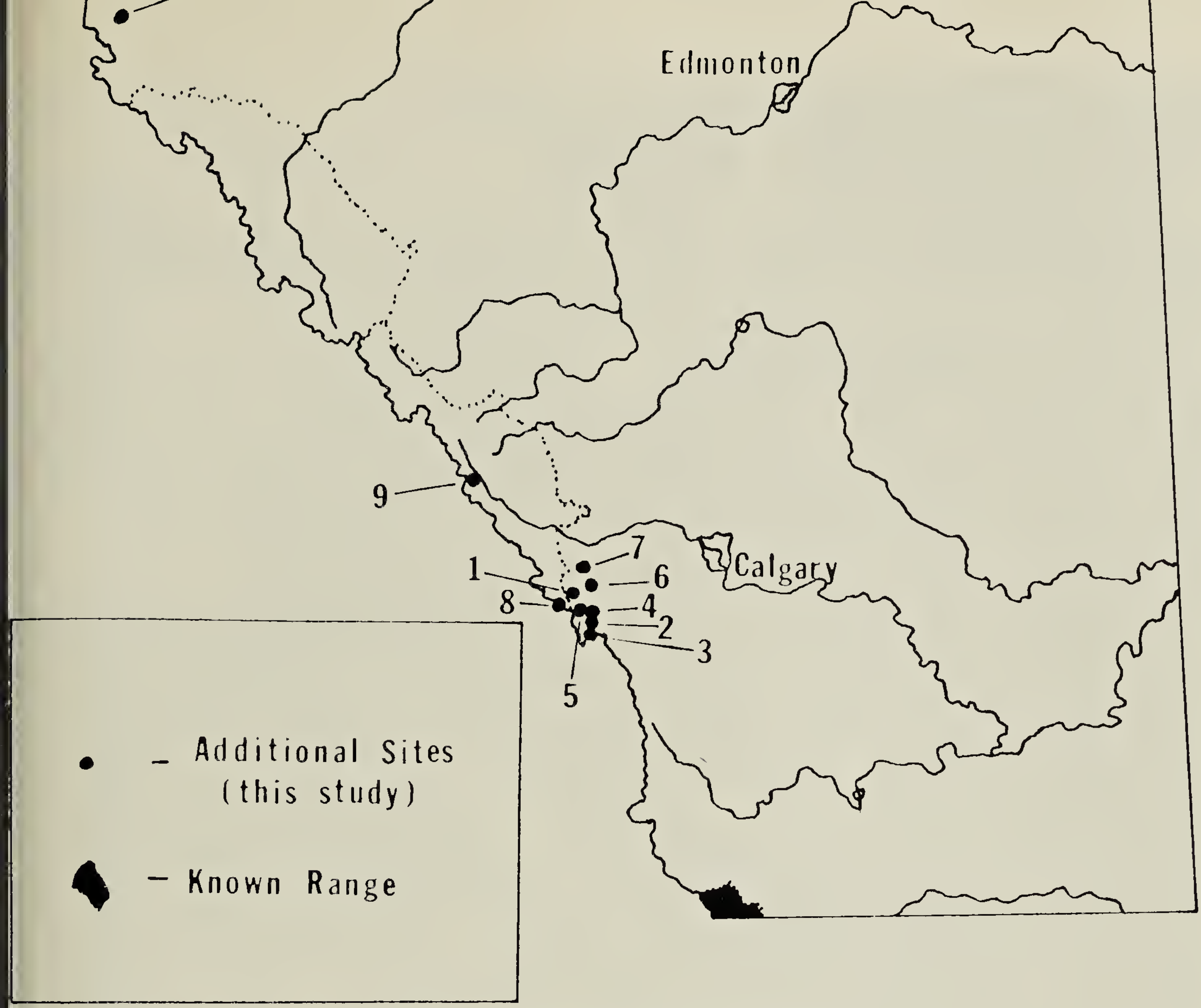
8. 1977 — July 13 — abundant on rocky slopes in Palliser Pass at 2290 m. — 2400 m elevation (M. Dyer *et al).*
9. 1977 — Sept. 15 — 1 large patch on trail to Mirror Lake just below Agnes Lake (Lake Louise Area) at 2075 m. elevation. (J. Christensen).

(D) Kakwa Park Reserve

10. 1977 — several stations noted during botanical inventory (D. Jaques).

Polystichum lonchitis is found on steep limestone and/or limestone — shale slopes which are open and only slightly vegetated. It prefers avalanche slopes and snow bed situations where there is a good supply of ground moisture throughout the growing season. The plants are usually found sheltered by shrubbery and/or overhanging rock ledges or boulders. Indeed, in some sites (e.g. Site 5, Kananaskis Park) the plants are almost completely hidden by willow, honeysuckle, fir or spruce shrubbery. The Green Spleenwort *(Asplenium viride* Huds.) is often associated with it (e.g. at sites 4, 8, and 6).

P. lonchitis appears to be a species of high elevations. The lowest station we know of north of Waterton is at 2010 m. A.S.L. (site 4) and here it was growing on a cool, east-north-east-facing slope. As well, we found it at this site growing (in better form) up



Map 1: Range of the Holly Fern (Polystichum lonchitis) *in Alberta.*

to 2230 m. It would seem to be at its best on rocky slopes near the treeline. Stations vary from a few plants (Station 2) to dozens of plants (Station 4).

Taylor shows *P. lonchitis* extending much further north in B.C. than we know of it in Alberta.[3]

The areas of Waterton Park and Kakwa Park reserve have a more moist climate than the intervening dry eastern slope of Alberta. It is common in Waterton and could well be so in Kakwa too. This suggests that we can expect to find the fern to be a regular part of the flora of the southern and northern portions of Alberta's Rocky Mountain east-slopes, being local and uncommon in areas of suitable micro-climate in between.

My thanks to Dr. D. Jaques of the Kananaskis Environmental Sciences Centre, University of Calgary, who provided important location data as well as valuable comments and discussions concerning the ecology of *P. lonchitis* in Alaska and of the east-slopes of Alberta.

I also appreciate the aid of the curators of the University of Calgary and University of Alberta herbaria for access to their institutions' collection. Joel Christensen and N. Kondla (Alberta Parks), and Mary Dyer (Canadian Wildlife Service) provided information concerning their finds. Dave Paton (Alberta Parks) also provided site information and was with me in the field in the Kananaskis Park area.

[1] BOIVIN, B. 1967. Flora of the Prairie Provinces (Part 1). Faculte d'Agriculture, Universite Laval, Laval.

[2] MOSS, E. H. 1959. The Flora of Alberta. Univ. of Toronto Press, Toronto.

[3] TAYLOR, T.M.C. 1970. Pacific Northwest Ferns and their Allies. Univ. of Toronto Press, Toronto.

AS THE WORM TURNS

GORDON J. SMITH, 588 Chalmers Avenue, Winnipeg, Manitoba R2L 0G6

In 1971 a milkweed began growing in our backyard. The first year it appeared I pulled it up not realizing what it was until the milky sap oozed from the broken stem. At the time I thought it was destroyed completely for it did not appear again. However, in May the following year, milkweed shoots began showing above ground and since then we have watched their growth, producing handsome flower clusters, occasional seed pods, and food for Monarch butterfly larvae.

Last year a Monarch butterfly was first noted depositing eggs on May 27. A total of 24 eggs were counted on three milkweed shoots 4-8 cm. high coming up over a metre away from the main plant which was 65 cm. in height. Only seven eggs were counted on the latter, most of them placed on the underside of the leaves. Practically all eggs deposited on stems disappeared in two or three days.

The first larva, about two mm long, was seen on June 3 and on June 25 pupae and caterpillars hanging upside down ready to transform were found under the leaves of the milkweed. Monarch butterflies were still laying eggs on the plant while the leaves were being devoured at an ever increasing rate by the growing larvae. One caterpillar was found hanging on the garage siding on June 28 and became a chrysalis the following day. Despite attempts to protect it, on July 14 it disappeared, a Common Grackle being suspected, (my wife having seen two nearby).

By mid-July the milkweed had lost all the upper leaves to the larvae as well as three undeveloped seed pods. On July 16 over 50 caterpillars were counted in the morning and by late afternoon the plant had been stripped bare of leaves. Most of the caterpillars disappeared, the few remaining ones feeding on scraps of leaves on the ground or the odd newly emerged milkweed sprout.

On July 20 another larva was seen on the garage siding, and, with better protection, a Monarch butterfly successfully emerged on August 8. A Common Grackle was seen in the backyard with a Monarch pupa on July 21, and, while we watched, broke it open and ate the contents, confirming our suspicion that this species was the culprit in the disappearance of some pupae at least.

Few larvae were seen in late July but pupae were hanging from our backyard fence and neighbor's garage, while others were found in the vegetable plot on cabbage and sunflower leaves. About two dozen pupae were seen but no doubt the total was higher as we only spotted the more obvious ones or found them when picking garden produce. The more exposed were placed in a can and several butterflies emerged.

After being denuded by the larvae the milkweed stems were cut down to ground level. New shoots began to grow and by mid-August the plant had reached a height of 70 cm, remaining there until cut down by frost. The past year was exceptional in that the plant was completely defoliated. Generally a few caterpillars are present and the loss of leaves is not too noticeable to a casual observer.

My family and several neighborhood children thoroughly enjoyed this spectacle of nature in action.

Monarch butterfly

Gary W. Seib

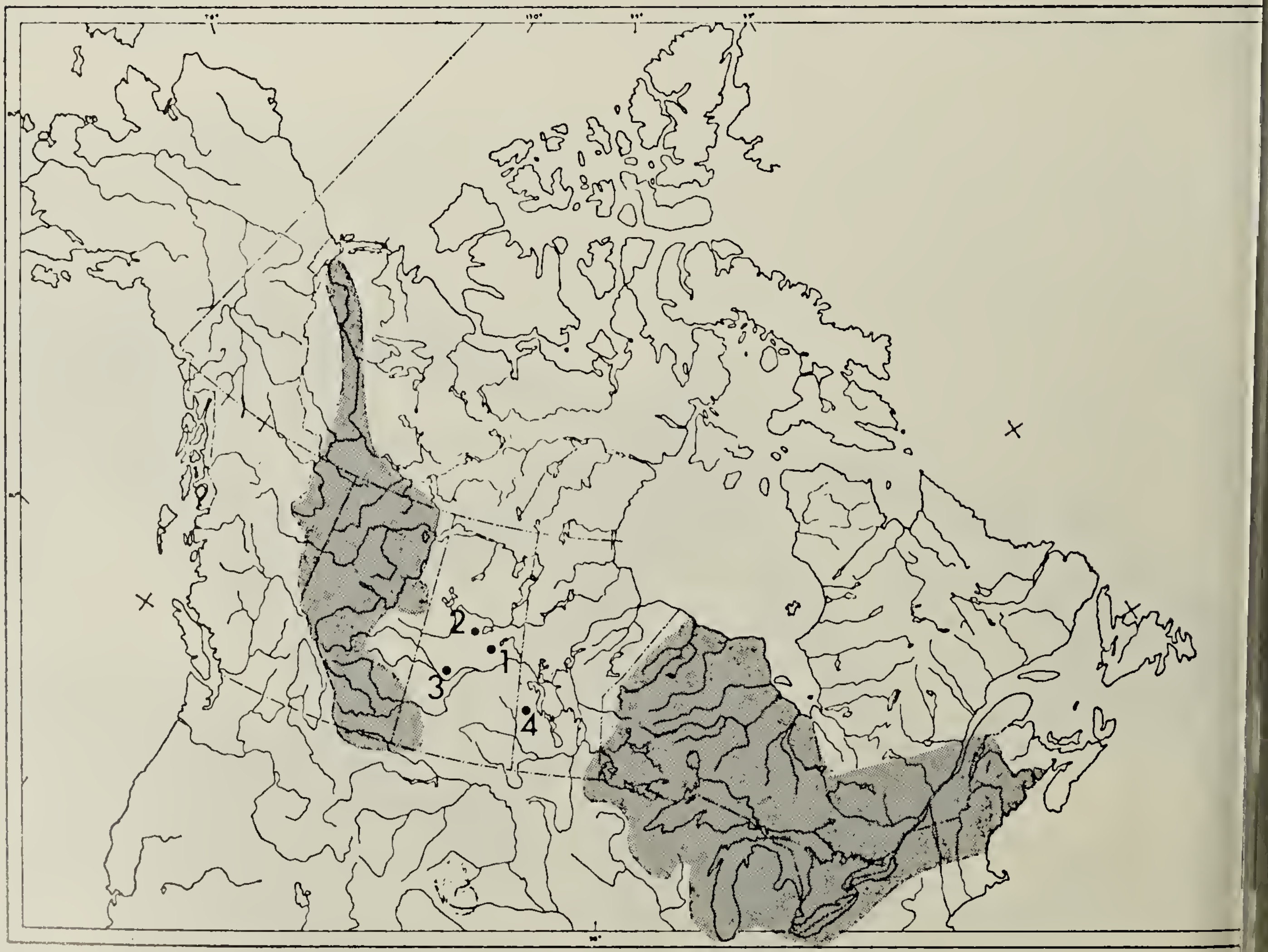
FINESCALE DACE IN SASKATCHEWAN

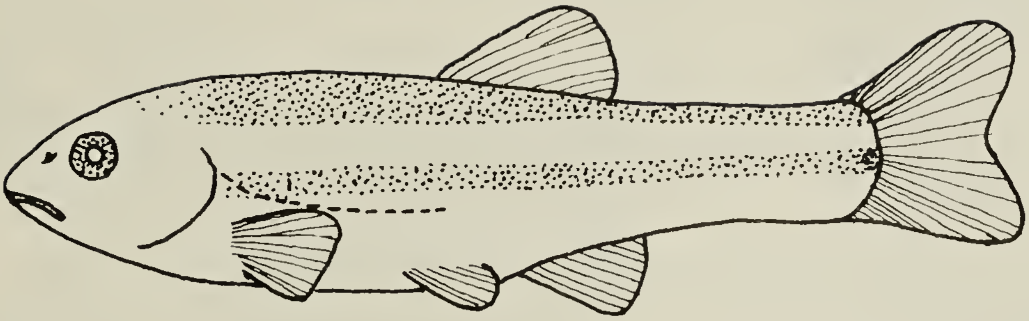
JEANIENE SMITH, Biology Department, University of Saskatchewan, Saskatoon

Finescale dace *(Chrosomus neogaeus)* are small silvery minnows which inhabit streams, ponds, and sometimes lakes, feeding on insect larvae and small crustaceans. The name finescale refers to the small scales covering the fish, which are so tiny that they are difficult to see with the naked eye. In Quebec, these minnows are called Ventre Citron, or Lemon-belly after the bright yellow belly and fins and crimson sides which the males acquire during spawning.

As seen on the map, the known range of finescale dace is divided into separate eastern and western parts, with only the tip of the western range extending into the Cypress Hills area of Saskatchewan. Last summer, finescale dace were collected by the author from several streams in Saskatchewan and Manitoba. They were found in: (1 the Caribou Creek near Piprell Lake (May 11, 1977) (2) Mile 4 Creek on the Besnard Lake road (June 29, 1977) and (3) an unnamed creek flowing into the north end of Redberry Lake. The dace in the latter creek were seen in spawning colors on July 19, and had lost their coloration by August 3 Finescale dace were also found at site (4): the Fishing River near the town o Mink Creek, Manitoba.

The finescale dace were found in th shallow rocky streams and deep pool along with pearl dace *(Semotilu*





Finescale Dace *Jeaniene Smith*

margarita) and brook stickleback *(Culaea inconstans).* These collections from widely separated points of central Saskatchewan and Manitoba seem to indicate that the range of finescale dace is continuous across Manitoba and Saskatchewan, rather than being isolated into separate eastern and western populations.

W. B. SCOTT and E. J. CROSSMAN. 1973. Freshwater Fishes of Canada. Bull. 184 Fisheries Research Board of Canada.

eflections on a quiet lake *J. B. Gollop*

THE EASTERN YELLOW-BELLIED RACER IN CANADA

K. J. FINLEY, LGL Ltd., 44 Eglinton Avenue West, Toronto, Ontario M4R 1A1, and
M. A. JASIENIUK, Dept. of Biology, University of Saskatchewan, Saskatoon

On May 23, 1977 we encountered a slim, olive-backed snake in a deep ravine of the Frenchman River Valley, just north (TP 1, R. 10, Sect. 10) of the Saskatchewan-United States border. Somewhat to the consternation of the cows that were grazing nearby, we succeeded in running down and capturing the hapless creature. After verifying its racing capabilities, we noted its bright lemon-yellow belly; the combination clearly indicated an eastern yellow-bellied racer *(Coluber constrictor flaviventris)* as illustrated and described in Stebbins.[10] The specimen, which was about 75 cm in length was photographed and then released to its damp habitat of grazed sedges. Photographs were sent to the National Museum of Natural Sciences, Ottawa and Francis Cook, Curator of Herpetology, confirmed the identification.

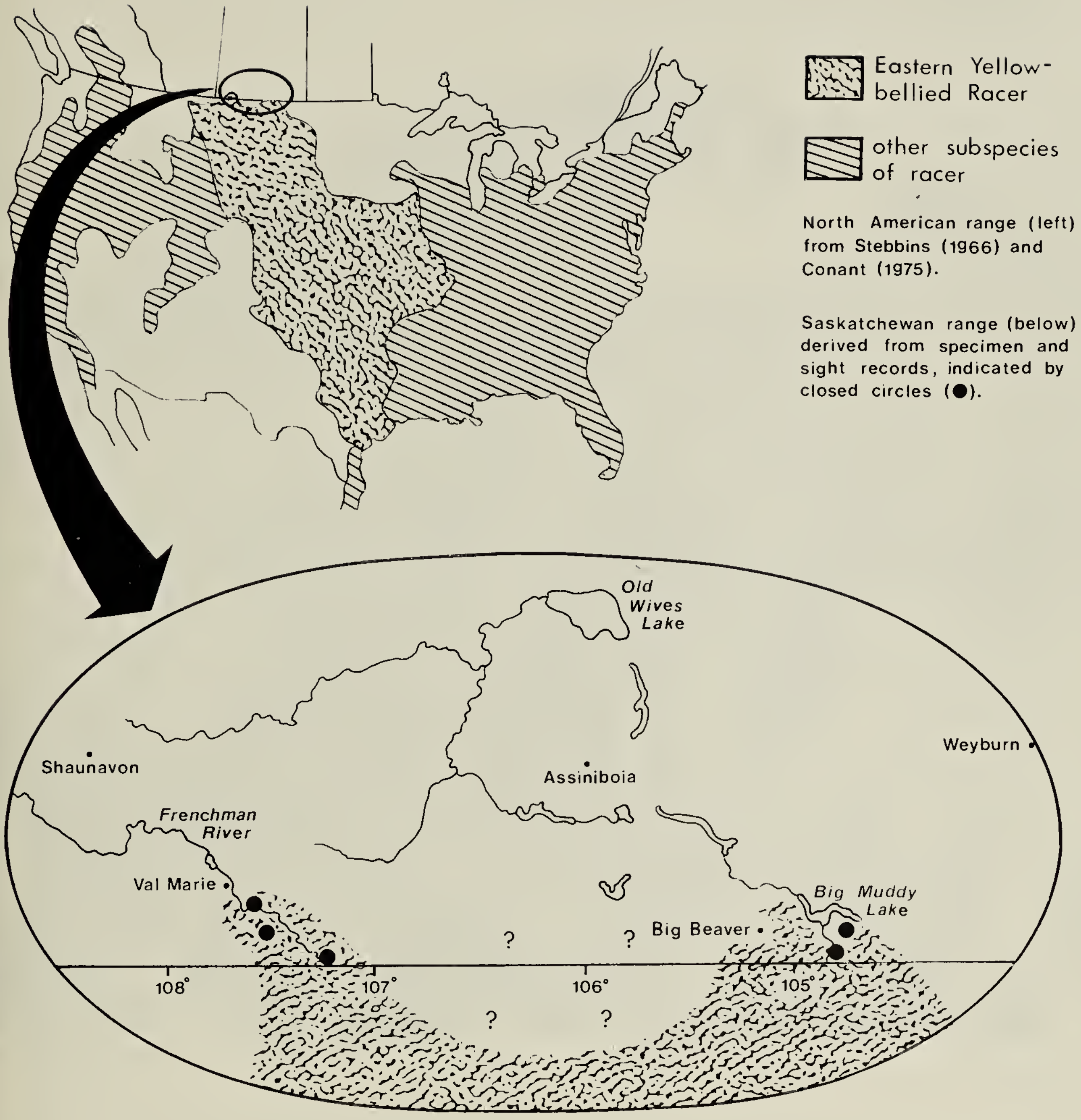
The first record[6] of this species in Canada consisted of two specimens taken on October 4, 1964 in the Frenchman River Valley approximately 30 km NW of the location reported herein. This remained the only locality for the racer in Canada until Morrison[7] casually mentioned that a racer had been killed on the Marshall ranch in the lower Big Muddy Valley in September 1968. Cook and van Zyll de Jong[4] confirmed the Morrison report when they collected a road killed racer *(sic)* in that vicinity on August 6, 1974.

Besides these published records, there are several unpublished observations of racers in Saskatchewan. These records, along with our own, allow us to better define the range of *C. C. flaviventris* in Canada.

G. Seib (pers. comm.) reports that in late April, 1968, three yellow-bellied racers were collected from a hibernaculum in the Frenchman River Valley (TP.2, R. 11, Sect. 3 or 10). Seib and W. Lynch saw two racers at this same hibernaculum on October 15, 1977: "On this rather cold day, the snakes were sunning themselves in company of some garter snakes at the hibernaculum entrance. We managaged to capture one racer, and took an extensive series of photographs". On September 25, 1977 John Woods (pers. comm.) and Bob Peart found a racer about 12 km southeast of Val Marie in the vicinity of the 'Snake Pit' or 'Rattlesnake Nest' — local names for a hibernaculum located at TP. 3, R. 12, Sect. 5. Woods and Peart observed a headless rat tlesnake in the hibernaculum and numerous bullet cases nearby.

Another record of a racer come from the Marshall ranch in the Bi Muddy Valley. An immatur speciment captured on July 4, 197 was transferred to the Saskatchewa Museum of Natural History an released a year later near its captur location (R. Kreba, pers. comm.).

The records indicate, as suggeste by Cook and van Zyll de Jong[4], that th range of the eastern yellow-bellie racer extends into Canada at tw locations — via the Frenchman Rive and Big Muddy Creek Valley (Fig. 1 Conant[5] also illustrates a bi-lobe northern extension of the racer on th Great Plains. It is possible that th



North American range (left) from Stebbins (1966) and Conant (1975).

Saskatchewan range (below) derived from specimen and sight records, indicated by closed circles (●).

hiatus results from inadequate coverage of the intervening area which ıas drainage and landform features imilar to the area where the racer ccurs.

Cook[3] noted that no reptiles are estricted in range entirely to Canada nd only in a narrow nationalistic view could they be considered rare or ndangered since in most cases they epresent the northern extremes of a arger continuous range in the United tates. However, these northern-most opulations may be uniquely adapted o northern conditions and their resence in certain areas also indicates the existence of unique habitats and climatic conditions for Canada. Perhaps one of the most importnat limiting factors in the distribution of the racer and other reptiles in southern Saskatchewan is the availability of hibernacula (denning sites). The badland features with associated slump structures in the Frenchman River and Big Muddy Valleys provide critical overwintering habitat. Here one may find impressive aggregations of snakes warming themselves in the waning sunlight of September and early October before they descend into overwintering caverns. In April

Eastern Yellow-bellied Racer *Wayne Lynch*

and May they emerge from the hibernacula and bask in the sun before they mate and disperse for the summer. Suitable denning sites appear to be limited and traditional — features which make them vulnerable to 'herpetophobes'. Indeed, the 'Snake Pits' of the Frenchman River Valley are well known to some ranchers who have been known to employ some devastating methods to eliminate the snakes. Stelfox noted that a large den of rattlesnakes on the Larsen ranch, where the first yellow-bellied racers were collected, was almost wiped out by dynamiting. He observed that such practices could eliminate local population very quickly. Woods' and Pearts observation of a headless rattlesnake suggest that local sentiments have not changed. However, recent developments may have some important ramifications.

The Frenchman River Valley may no longer remain "a remote and relatively undisturbed ranching region"[2], since it is now the proposed site of a National Grasslands Park. For the racer, the significance of such a development "is quite simply that there is no other National Park which includes grassland amphibians and reptiles . . . at least not to the extent that the Killdeer — Val Marie concept encompasses" (Cook pers. comm.). National parks policy may provide for habitat conservation of critical areas for rare or endangered species; however, this does not ensure their survival. Indeed the area of the proposed park is relatively small and if human use is maximized, habitat destruction may occur to the detriment of badland and grassland species.

Other species of reptiles known or suspected to occur in the Killdeer — Val Marie area include the Western Painted Turtle *((Chrysemys picta belli)*, Snapping Turtle *(Chelydra serpentina)*, Northern Short-horned Lizard *(Phrynosoma douglassi brevirostre)*, Western Hognose Snake *(Heterodon nasicus)*, Bullsnake *(Pituophis melanoleucus sayi)*, Plains Garter Snake *(Thamnophis radix)*, Wandering Garter Snake *(T. elegans)* and the Prairie Rattlesnake *(Crotalus viridis)*.[1,2,5,8,9] Amphibians that probably occur in the area include the Plains Spadefoot Toad *(Scaphiopus bombifrons)*, Leopard Frog *(Rana pipiens)*, Boreal Chorus Frog *(Pseudacris triseriata maculata)*, possibly the Canadian Toad *(Bufo hemiophrys)* and certainly the Blotched Tiger Salamander *(Ambystoma tigrinum melanostictum*.[1,2,5,10] The Great Plains Toad *(Bufo cognatus)*, although not specifically recorded from Killdeer — Val Marie, has been taken in the Maple Creek — Tompkins area and its range probably includes the area of concern (Cook pers. comm.). Several of these species, like the racer, represent northern range limits of the herpetofauna of the Great Plains; a National Grasslands Park in the Killdeer — Val Marie area of southern Saskatchewan, if well managed, may ensure the survival of several of these species.

Acknowledgements

We wish to thank Francis Cook for confirming identification of the snake and for his helpful comments. John Woods, Gary Seib and Robert Kreba supplied unpublished records. Wayne Renaud kindly prepared the maps. LGL Ltd., environmental research associates, provided technical assistance in preparing this article.

[1] COOK, F. R. 1965. Additions to the known range of some amphibians and reptiles in Saskatchewan. Can. Field-Nat. 79:112-120.

[2] COOK, F. R. 1970. Rare or endangered Canadian amphibians and reptiles. Can. Field-Nat. 84:9-16.

[3] COOK, F. R. 1977. Review of the Canadian Herpetological Scene. *In:* T. Mosquin and C. Suchal (eds.) Canada's Threatened Species and Habitats. Canadian Nature Federation, Ottawa, p. 117-121.

[4] COOK, F. R. and C. G. van Zyll de Jong. 1975. Eastern yellow-bellied racer in central southern Saskatchewan. Can. Field Nat. 89:174-175.

[5] CONANT, R. 1975. A field guide to reptiles and amphibians of eastern and central North America. The Peterson Field Guide Series, Houghton Mifflin Co., Boston. 729 pp.

[6] MAHER, W. J. and W. H. BECK. 1964. Two records of the yellow-bellied racer in Saskatchewan. Blue Jay 22:174.

[7] MORRISON, H. 1969. A preliminary botanical survey of the Big Muddy Valley in southern Saskatchewan, 1968. Blue Jay 27:42-53.

[8] PENDLEBURY, G. B. 1976. The Western Hognose Snake, *Heterodon nasicus nasicus,* in Alberta. Can. Field-Nat. 90:416-422.

[9] PENDLEBURY, G. B. 1977. Distribution and abundance of the Prairie Rattlesnake, *Crotalus viridis viridis,* in Canada. Can. Field-Nat. 91:122-129.

[10] STEBBINS, R. C. 1966. A field guide to western reptiles and amphibians. The Peterson Field Guide Series, Houghton Mifflin Co., Boston. 279 pp.

[11] STELFOX, J. G. 1966. An investigation of the current status of prairie dogs *(Cynomys ludovicianus ludovicianus (Ord))* in the Val Marie, Saskatchewan area. Progress Report for Parks Canada. 40 pp.

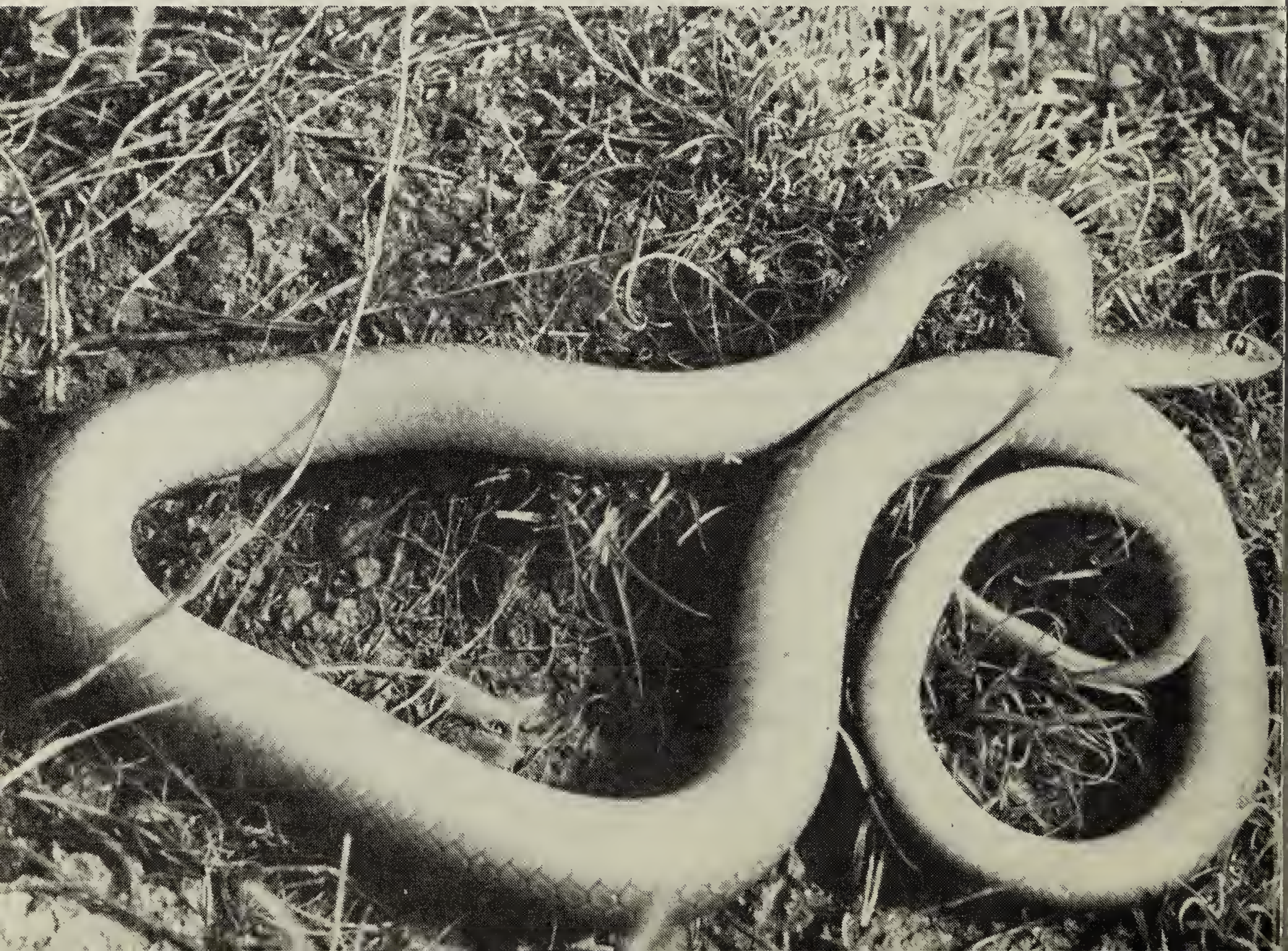
DEATH-FEIGNING IN THE EASTERN YELLOW-BELLIED RACER

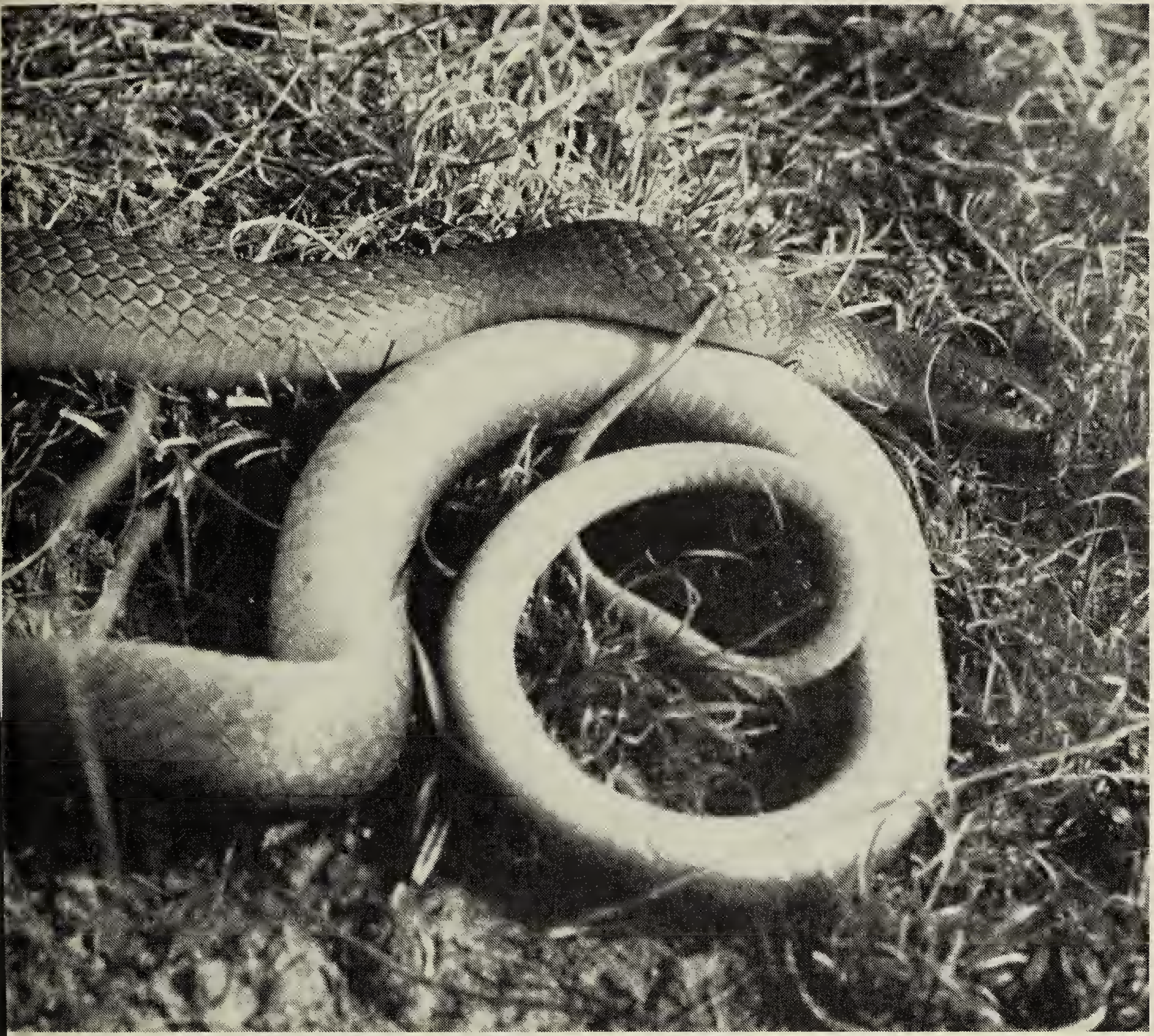
WAYNE LYNCH, 1762 Kilborn Avenue, Ottawa, Ontario K1H 6W2

At midmorning on October 15, 1977 Gary Seib and I visited a hibernaculum 7½ miles south-east of Val Marie, Saskatchewan. Despite the cool temperature (45°F) we found a pair of eastern yellow-bellied racers *(Coluber constrictor flaviventris)* sunning at the mouth of the den. When we captured one, it writhed vigorously, discharging secretions from its cloacal glands and several times assumed a threatening pose with its mouth gaping. The initial resistance was shortlived and it settled within minutes. After handling for 20 minutes we released the racer on the ground where it rolled on its back exposing the distal two-thirds of its yellow underside. For 30 seconds it remained motionless in this pose before slowly moving off. Upon recapture it repeated the display which again lasted half a minute. Subsequent release and capture failed to stimulate further death-feigning. Once replaced at the mouth of the hibernaculum the racer required prodding before disappearing into the den.

All animals require that behavior be adaptive for survival. Of the 23 species of snakes in Canada, however, only the hognose snake *(Heterodon)* regularly includes death-feigning in its repertoire. The death-feign is just one part of a three phase response seen in snakes that use this technique to confuse predators. The first phase, erratic behavior, surprises predators and hopefully foils their attack. In

Death-feigning in the Eastern Yellow-bellied Racer *Wayne Lynch*





eath-feigning in the Eastern Yellow-bellied Dancer — Wayne Lynch

ddition, the noxious secretions roduced by the cloacal glands are pread more effectively as the snake hrashes about. Tactile stimulation sually initiates this phase but visual nd olfactory clues may also stimulate response in some species. The second hase is the death-feign. The final hase is cautious recovery. It seems hat it is not the death-feign itself that auses predators to release their prey ut the sudden shift from erratic ehavior to a motionless state. ehlbach illustrated this point using ingsnakes *(Lampropeltis),* a species hat commonly preys on other snakes.[2] snake offered in a death-feign was sually eaten whereas one that ehaved in the entire three phase equence was captured and generally released. Thereafter, snakes usually attempt escape but will repeat the death-feign if touched, especially on the head.

Fitch has described erratic behavior in the eastern yellow bellied racer but death feigning was not previously reported in this species.

---

[1] FITCH, H. S. 1963.The Natural History of the Racer Coluber constrictor. The Univ. of Kansas Mus. of Nat. Hist. Pub. 15, pp. 351-468.

[2] GEHLBACH, FREDERICK. 1970. Death-Feigning and Erratic Behavior in Leptotyphlopid, Colubrid and Elapid Snakes. Herpetologica 26(1):24-34.

OBSERVATIONS OF AN EASTERN YELLOW-BELLIED RACER IN CAPTIVITY

ROBERT KREBA, Saskatchewan Museum of Natural History, Regina, Saskatchewan

On July 5, 1976, a slender, olive green snake with a yellow belly was brought into the Museum of Natural History in Regina for identification by Jeanette Godvin, then of Regina, who said that it had been caught the previous day, by a James Marshall, in a farmyard 18 miles East of Big Beaver, Saskatchewan, in the Big Muddy valley.

Ron Tillie, of the Museum staff, identified it as an Eastern Yellow-bellied Racer, *Coluber constrictor flaviventris),* and the snake was left at the Museum. I had been out of the building when it was brought in, and did not see it until several hours later. I asked what was to be done with it, and when told that it would probably be killed for a specimen, offered to take it home. I took it away that night, and kept it until released, again in the Big Muddy valley, over a year later.

The Eastern Yellow-bellied Racer is a rare species in Canada, so far recorded only from extreme southern Saskatchewan. First recorded in 1964,[5] it has been found in the Val Marie area in the southwest,[1 4] and the Big Muddy valley in the south-central part of the province.[2] My specimen was the third Big Muddy record. For a complete summary of the distribution and habitat requirements of this species in Saskatchewan, see the preceding article by Finley and Jasieniuk.

My specimen was an olive green colour on the dorsal surface with a faint brownish cast. There was also a series of brown saddle-shaped blotches from behind the head to the end of the tail, but these were rather faint. The underside was a dull yellow, without any markings; the underside of the chin was a dirty white, and the tongue was black. It measured 29 inches in length, and was quite slender, showing only moderate thickening of the body Based on the colour pattern, the snake was probably in its second or possibly third year.[3] As the tail tapered gradually, without any abruptness from the end of the body, I assumed i to be a male.[6] However, I did no attempt to evert the hemipenes t confirm this.

I constructed a terraruim for it usin an iron-framed aquarium, filled wit sand to a depth of two inches. Severa flat pieces of slate were arranged t form a cave at one end, and a potte plant called a Panimiga *(Pilea in volucratra)* was at the other end. branching piece of driftwood wa placed length-wise across th terraruim for climbing, and a heav glass ashtray four inches square an one and one-quarter inches deep, wa sunk into the sand to provide a wate dish. I covered the top with windo screen secured to a tightly fitti wooden frame for ventilation, and a aquarium light hood, with two 40 wa bulbs, for heat and light.

During capture, the racer had bee

pinned down with a stick, resulting in several broken ribs and a bad wound on the left side, ten inches back from the head. A section of muscle had been severed, and was protruding from the wound. Rather than try to do any surgery, I simply swabbed the wound with disinfectant and let nature heal her own, which turned out to be the best course. The wound healed completely within about five weeks.

In the first few days I had it, the racer was very inactive and showed no inclination to bite. Even when left on an open surface it would not attempt to escape, but would just wind itself into a coil, head on top, and remain motionless. In light of later more active behaviour, I can only assume that the wound was quite painful and made movement difficult.

The racer, and its relatives the whipsnakes, *(Masticophis* spp.), are regarded as being very nervous snakes, making poor pets and not adapting to captivity.[4] [7] In most cases, these snakes refuse to feed, and spend all their time frantically searching for escape from their confinement. The ultimate end of these snakes in captivity is usually death from starvation and exhaustion.

My racer did not feed the first day, but was feeding well within a week, and although it never truly reconciled tself to captivity, seemed to do well. I suspect that if it had not been forced nto a docile state by its initial disability, it might not have adapted as well as it did.

From the start it was fed mainly on field crickets, *(Gryllus* sp.,) which it was very fond of, and seemed to prefer o all other insect prey. It was also given mealworms, grasshoppers of several species, large moths, dragon flies, and an occasional caterpillar or beetle. On the vertebrate side, I offered it boreal chorus frogs, *(Pseudacris triseriata maculata),* and young white mice, *(Mus musculus),* and gerbils, *(Gerbillus* sp.). I once showed it a Smooth Green Snake, *(Opheodrys vernalis),* which it immediately struck at and no doubt would have consumed if I had allowed it to do so. This diet corresponds well to the natural diet of the eastern yellow-bellied racer as described by Fitch.[3]

Its method of capturing prey was simply to strike and grab its victim, and then to work the prey around in its jaws so that it could be swallowed head first. It did not seem to be able to recognize an animal as potential prey until it moved, at which time it usually struck at it directly without much preliminary stalking.

During the winter months it did not show any indication of going into hibernation or any semi-dormant state, and still fed regularly, though not as often. At this time, its diet consisted exclusively of meal worms, *(Tenebrio),* and young mice or gerbils, from pet shops. Both of these food items offered special problems.

The mealworms, which are the larval form of a species of flour bettle, did not move very much, and sometimes it would take the snake over an hour to consume only twenty of them. A slight movement would attract his attention, but until the mealworm moved again, the racer would not take it. Besides, I do not think he liked them much, and sometimes would leave half of them, showing little enthusiasm even when quite hungry.

The racer particularly relished newborn white mice and gerbils, but I was not always able to get them this young.

Eastern Yellow-bellied Racer *Gary W. Sei*

He was able to handle larger mice up to slightly over an inch in body length provided their eyes had not yet opened, but could not catch older mice or gerbils whose eyes had opened. The problem seemed to be not one of prey size, but getting a good hold on the rodent through the body hair. On one occasion he did catch a half-grown white mouse by surprising it and grabbing it on the snout before the mouse was aware of its presence. One other time, he ate a dead mouse which died before I could get it home. By this time the racer had been fed white mice regularly, and had not been fed for almost a month. I did not expect any results, but dropped the freshly dead mouse into the terrarium anyway; the snake grabbed it immediately and consumed it without hesitation.

After feeding the racer would retrea into his cave, and remain there unti the meal was digested. This usuall took about three days, though a larg mouse might take up to a week fo digestion. He was fed once or twice week during the summer and early fal but during late fall through to sprin only every two or three weeks.

He did not seem to require muc water, but would drink readily from hi bowl if he had not had water for week or so. He spent a lot of tim curled up in the Panimiga plant, an seemed to particularly enjoy it when watered the plant at these time providing him with a shower and drink, which he would "lap up" fro the quilted surface of the leaves usin his tongue. When drinking from h bowl, he would immerse his hea about half way and appeared to be pumping the water in by suction. On rare occasions he would coil up in the water bowl, particularly on hot days, but only for a short period of time.

I handled the racer infrequently, and made no attempt to tame him. After he recovered from his initial disability, the racer became very active and spent a lot of time prowling around the terrarium. At times it was obvious he was seeking a hole or crack by which to escape, but after three or four months seemed quite resigned to his situation. He enjoyed basking on the driftwood branch, and also curling up in the Panimiga plant, which brought him closer to the warm lights. Racers have good eyesight, and this very alert snake always seemed conscious of anyone in the room outside his terrarium.

He was docile enough if left alone, but at times would become highly nervous and aggressive, striking against the glass even if you crossed the other side of the room. He would usually strike if you put your hand in the terrarium or tried to pick him up. Once caught he would not bite the hand holding or supporting him, and usually calmed down. He enjoyed exploring any holes or crannies, such as pockets or shirt sleeves, and seams in the upholstery of the living-room furniture. I was fortunate that he never got away from me or escaped from his terrarium, as he would have been very difficult to track down.

I was bitten about half a dozen times, but he managed to break the skin on my hand and draw blood only once. The lacerations were small, but stung smartly. In contrast to a single lunge and hold used in capturing prey, he would make several strikes in very quick succession when defending himself from my "attacks".

The yellow-bellied racer shed his skin three times while I had him, during August and November of 1976, and again in May of 1977. Each time his colours became very dull and the spectacle scales over his eyes clouded over a week to ten days before shedding. Schmidt and Davis state that snakes cannot see when this eye scale is clouded,[6] but it did not seem to blind the racer, at least not totally. Within 24 hours of these lenses clearing, the racer would shed. I unfortunately was not ever present to see the process, and would come home to find the cast skin wrapped around the slate rocks and other objects in the terrarium. On one occasion he shed during a space of two and a half hours. I went out briefly and he had shed when I returned.

After his first shedding, the wound incurred during his capture appeared to be completely healed, leaving an inconspicuous scar where the scale row pattern had been disrupted.

Following shedding, the colours were much brighter, especially the yellow on the belly. The saddle-shaped blotching on the dorsal surface became progressively fainter with each shed, being barely noticeable by the time I finally released him. Also, the brownish cast on the dorsal surface seemed to fade, making the green colour less drab.

Only after the second shedding was the shed skin in one piece without a break; the other times it was broken into three or four sections. Following the third shedding, I measured the racer to find he had grown to a length of 31½ inches.

Eastern Yellow-bellied Racer *Wayne Lynch*

I enjoyed keeping this unusual snake more than any other I had kept previously. He was always alert and usually active, and was a real conversation piece whenever company came over. However, it was never my intention to keep him as a pet forever, realizing that he belonged back in his native habitat and not in a glass cage.

On the afternoon of July 17, I released the racer in thick grass at the head of a lightly wooded coulee in the northeast end of the Big Muddy valley, about 3½ miles south-southeast of Big Muddy Lake.

He took off without so much as a look back or a "thank you", not that I really expected one. I can only hope that he will be successful in finding a mate and that he lives happily to the end of his days.

[1] COOK, F. R. 1966. A guide to the amphibians and reptiles of Saskatchewan Popular Series 13, Saskatchewan Mus Nat. Hist.

[2] COOK, F. R. and C. G. VAN ZYLL DE JONG. 1975. Eastern yellow-bellied racer in central southern Saskatchewan. Can Field-Nat. 89:174-175.

[3] FITCH, H. S. 1963. Natural History of the Racer Coluber constrictor. Univ. of Kansas Publ., Lawrence Kansas, 15(8):351-468.

[4] FROOM, B. 1972. The Snakes of Canada McClelland & Steward Let., Toronto.

[5] MAHER, W. J. and W. H. BECK. 1964. Two records of the yellow-bellied racer in Saskatchewan. Blue Jay 22(4):174.

[6] SCHMIDT, K. P. and D. D. DAVIS. 1941 Field Book of Snakes of the United States and Canada. G.P. Putnam's Sons New York.

[7] SMITH, H. M. 1965. Snakes As Pets. T.F.H Publications Inc., New Jersey.

ARRIVAL OF THE HOUSE SPARROW ON THE PRAIRIES

C. STUART HOUSTON, 863 University Drive, Saskatoon, Saskatchewan S7N 0J8

It is surprising how little information is available concerning the arrival of the House Sparrow on the Canadian prairies. In part this was because its advent coincided with the flood of settlers, most of whom were quite unaware of the significance of a few sparrows that would have gone unnoticed where these people originated.

South of the border, more attention was paid to this rapidly spreading pest. In fact, the first Bulletin of the U.S. Department of Agriculture was a 405-page publication: *The English Sparrow in North America, especially in its relation to Agriculture.*[1] In it, Walter B. Barrows documented the spread as far as the twin cities of Minneapolis-St. Paul, Minnesota, by the fall of 1886, augmented in a minor way by the release of a dozen birds in St. Paul in 1875.[14] Barrows reported the House Sparrow had spread over more than a half-million square miles of new territory on this continent between 1880 and 1885, and in 1886 alone had spread over another half-million square miles. Although it had occupied 148,000 square miles in eastern Canada by this time, Barrow had negative reports from A. McArthur and L. H. Smith of Winnipeg, and from George F. Guernsey of Fort Qu'Appelle, indicating that it had not yet reached the Canadian Northwest.

The House Sparrow did not reach North Dakota for another 7 years. Robert E. Stewart's *Breeding birds of North Dakota* documents how the first few sparrows reached Fargo on August 6, 1893, when they were nowhere else in the state. There were eight at Cando in the fall of 1894, with a few raised in 1895; the first definite nest report was of a 'rotten egg and three young' at Stump Lake June 17, 1905. By 1909, they were present in most towns and on most Dakota farms.[17]

The first published record for western Canada was that of John Macoun: "In 1894, a few pairs were seen near the railway station at Winnipeg, Man.; since then they have spread rapidly westward."[11]

The most complete record for any prairie locality appears in the diary of Percy Criddle,[7] further details of which have been provided by his granddaughter, Alma Criddle. On November 10, 1897, Percy recorded that "Sparrows have arrived as far west as Brandon — saw at least 100 feeding and flitting about in the roads yesterday." The first individual reached the Criddle farm, near Aweme post office and north of the hamlet of Treesbank, 25 miles southeast of Brandon on April 8, 1899: "A real common English sparrow around the buildings — whence it came of course no one knows — possibly from Brandon where there are lots." By October 30, 1902, Percy noted "A flight of English sparrows, about 20, around the house — Brandon is now full of them — and little lots often appear here late in autumn, but I've seen none in the summer." On October 30, 1903, Percy noted: "English sparrows getting about — Cullen [a neighbor] has over 100 (about a dozen last year). Now *we* have several around — Brandon is swarming with them." His final entry on this subject was dated March 9, 1908: "We've 6 or 7 sparrows all through this winter — McLeod's [a neighbor] have 20 or 30 — other farms the same. The little devils are steadily increasing and there'll be trouble presently I expect." The House Sparrow had become a regular and accepted species that did not warrant further mention.

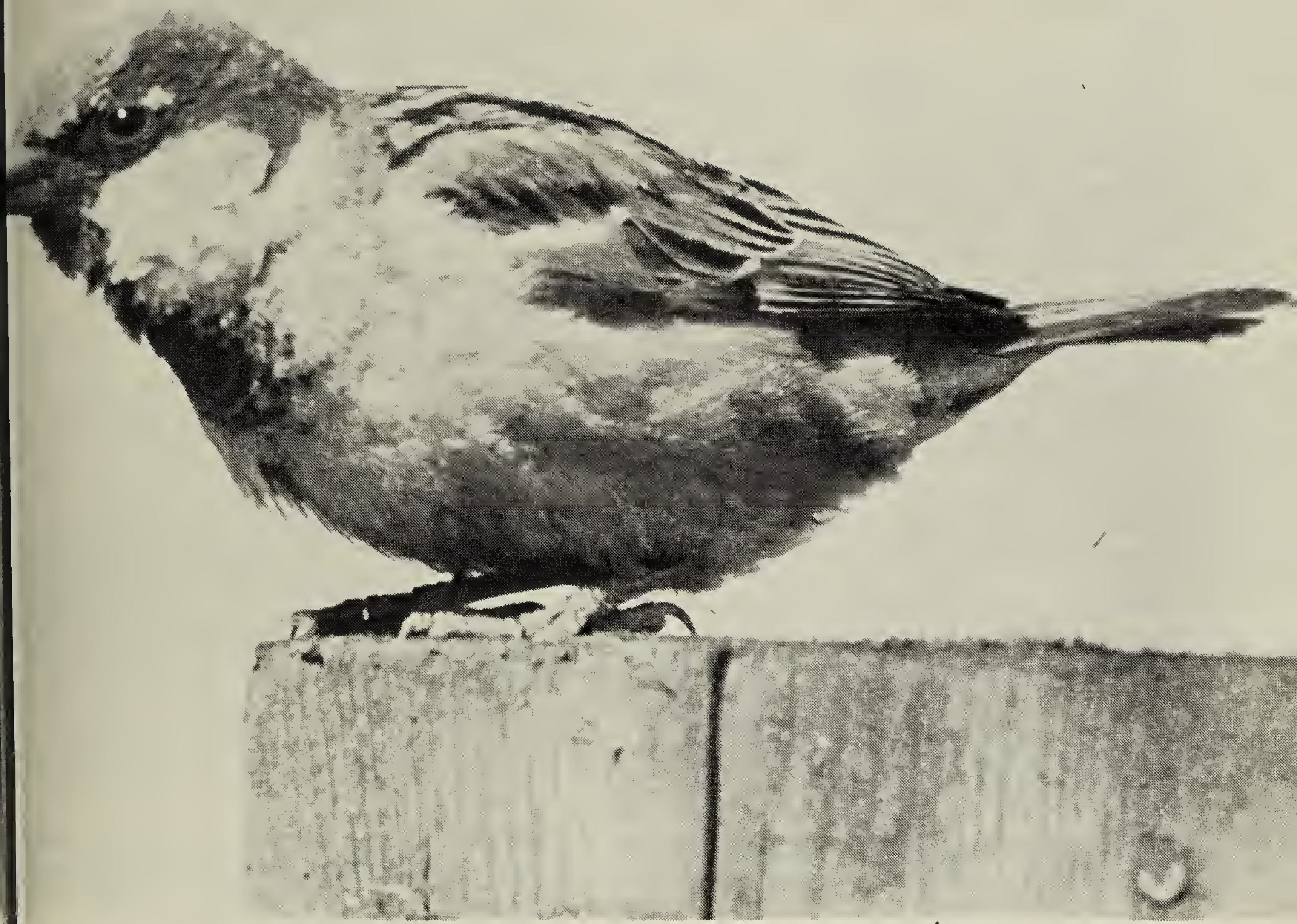
Mitchell in 1924 stated that this species "appears to have invaded Saskatchewan about 1898" but gave no documentation as to localities or observers.[12] The following comments

Female House Sparrow *Fred W. Lahrman*

of the oologist, Walter Raine, quoted by Macoun, provide the first nesting records for Saskatchewan: "This bird is gradually extending its range westward and northwestward. I found it nesting at Yorkton, Sask., in June, 1901, and Mr. Hugh Richardson, during the summer of 1901, sent me two sets (of what he called rare eggs) of a bird that had never been seen before in the Qu'Appelle valley, Sask., a bird unknown to him, and they turned out to be only eggs of the English sparrow. I have no record of this bird from Alberta, but it is only a matter of time when it will extend its range right to the Rocky mountain foothills."[11]

No House Sparrows were mentioned in the migration records of Miss Esther Wemyss, sent to the United States Biological Survey from Starr Point School, 4 miles south and 3 miles west of Qu'Appelle station, in 1898 and 1899, nor in the records sent under her married name of Esther Cates from Bonnie Brae farm, 9 miles south of Qu'Appelle, in 1901 or 1902. In the spring of 1903, Mrs. Cates reported that "English sparrows have reached this station." In 1904, English Sparrows were first seen on April 16, next on April 17 and became common on April 20. In 1905, two were seen on March 4, with sightings again on March 5 and they became common on April 9. In 1906, two were seen on March 8, the date they became common. In 1907, the "English House Sparrow" became the first entry on the migration list, on February 10, the day that it "came to the house again . . . having wintered round the stables." Thereafter the House Sparrow was a regular year-round resident, omitted from the migration lists of all subsequent years.

Intensive bird surveys in the Maple Creek area in 1905 and 1906, carried out by a group of ornithologists led by A. C. Bent, failed to record the House Sparrow.[2] The first House Sparrows reached Laurence B. Potter's Gower



Male House Sparrow

Fred W. Lahrman

Ranch near Eastend on October 6, 1907.[13]

Russell T. Congdon, who studied birds in the Kinistino area in 1902, noted that "This little pest has wandered to the Saskatchewan region, but does not yet exist in such large numbers as to be the nuisance that it is arther south."[6] John F. Ferry, in his 909 collecting expedition, noted House Sparrows at Prince Albert and t a farm 8 miles southeast of Prince Albert, and noted one or more at Quill ake on June 27, 1909.[9] Captain Angus Buchanan was somewhat surprised to ind that House Sparrows had already eached Big River on May 12, 1914, nd was even more surprised to find hem at Ile-a-la-Crosse on May 22-24, 914.[5] A United States Biological urvey party, comprised of Francis Harper, Hamilton M. Laing and J. lden Loring, collected one House parrow at Lake Athabasca in 1920.[3]

The House Sparrow continued to increase in numbers, and there is a note in the annual report of the Saskatchewan Provincial Museum for 1924 that it showed a "continued increase throughout the province . . . these are coming into the province from the east."[4] Maurice Street, after talking to oldtimers, reported that this species probably arrived in the Tisdale-Nipawin area shortly after the first settlers about 1908. It was seen by Street as early as 1918 and became common by 1925.[10]

It is surprising that J. Dewey Soper had no records for Waskesiu townsite as late as 1952, the only record for Prince Albert National Park being a few seen near the south gate of the park.[16] By 1960, I found them common in the Waskesiu townsite.

Although Macoun knew of no Alberta records in 1904, Frank L. Farley had made an unusually early observation of several House Sparrows feeding along the railroad tracks in the town of Red Deer in the summer of 1898.[8]

The overall spread of the House Sparrow across North America has been well displayed in a series of maps prepared by Chandler S. Robbins.[15] The species had reached Edmonton, Alberta, by 1910, but the Rocky Mountains in Canada and an area of northwestern Montana had not yet been invaded at that time. As measured by the Breeding Bird Surveys of 1968, House Sparrows remain sparsely represented wherever human population is sparse, including Nevada, much of Utah, southern Idaho, and all but the northern portion of Montana.[15] In keeping with this, in the northern half of Saskatchewan we still find House Sparrows restricted to the immediate area of each settlement. It is no wonder that their initial spread coincided closely with that of the human settlers.

Acknowledgements: I wish to thank Chandler S. Robbins, Chief of Migratory Non-Game Bird Studies, U.S. Fish and Wildlife Service, for photocopies of the migration dates submitted to the Biological Survey by the late Mrs. Esther Cates, and Miss Alma Criddle of Winnipeg, for complete relevant excerpts from her grandfather's diary.

[1] BARROWS, W. B. 1889. The English Sparrow Passer domesticus, in North America, Especially in its Relations to Agriculture. Govt. Printing Office, Washington. 405 pp.

[2] BENT, A. C. 1907 & 1908. Summer birds of southwestern Saskatchewan. Auk 24:407-430 & 25:25-35.

[3] BRADSHAW, F. 1921. Report of the Chief Game Guardian for the year ending April 30, 1921. King's Printer, Regina. 53 pp.

[4] BRADSHAW, F. 1925. Report of the Game Commisioner for the year ended April 30, 1925. King's Printer, Regina. 44 pp.

[5] BUCHANAN, A. 1920. Wild Life in Canada. John Murray, London. 264 pp.

[6] CONGDON, R. T. 1903. Saskatchewan birds. Trans. Wisconsin Acad. 14:569-620.

[7] CRIDDLE, A. 1973. Criddle-de-diddle-ensis, a Biographical History of the Criddles of Aweme. Alma Criddle, Winnipeg. 288 pp.

[8] FARLEY, F. L. 1932. Birds of the Battl River Region. Institute of Applied Art, Edmonton. 85 pp.

[9] FERRY, J. F. 1910. Birds observed i Saskatchewan during the summer o 1909. Auk 27:185-204.

[10] HOUSTON, C. S. and M. G. STREET. 1959 The Birds of the Saskatchewan River Carlton to Cumberland. Sask. Nat. Hist Soc., spec. pub. #3, Regina. 205 pp.

[11] MACOUN, J. 1904. Catalogue of Canadia Birds. Part III. S. E. Dawson, Queen' Printer, Ottawa, 345 pp.

[12] MITCHELL, H. H. 1924. Birds of Saskat chewan. Can. Field-Nat. 38:101-118.

[13] POTTER, L. B. 1930. Bird-life changes i twenty-five years in southwester Saskatchewan. Can. Field-Nat. 44:147 149.

[14] ROBERTS, T. S. 1936. Birds of Minnesot University of Minnesota Press, Mi neapolis. Vol. 2, p. 283.

[15] ROBBINS, C. S. 1973. Introduction, sprea and present abundance of the Hous Sparrow in North America. IN: Symposium on the House Sparrow an European Tree Sparrow in Nort America. Ornith. Monographs #1 American Ornithologists' Unio Lawrence, Kansas.

[16] SOPER, J. D. 1952. The Birds of Princ Albert National Park, Saskatchewa Wildlife Management Bull., Series 2, N 4. Canadian Wildlife Service, Ottawa. 9 pp.

[17] STEWART, R. E. 1975. Breeding birds North Dakota. Tri-College Center f Environmental Studies, Fargo, Nort Dakota. 295 pp.

THE BIRDS OF DINOSAUR PROVINCIAL PARK, ALBERTA

NORBERT G. KONDLA, Parks Planning & Design Branch, Alberta Recreation, Parks & Wildlife, 9912 — 106 Street, Edmonton

Dinosaur Provincial Park contains some of the finest badlands terrain in Canada and is internationally known for its numerous dinosaurian fossils. However, relatively little is known of the natural history of this fascinating area. Other than reports in 1919 and 1946, little information is available concerning the avifauna of the area.[17 14] This paper deals with the birds of the park based on observations made in 1971 for the Alberta Department of Lands and Forests.[7]

METHODS. From May 17 to August 7, 1971, the winter and Hugh Crawford conducted general natural history surveys in the park. Major physiographic subdivisions of the park were investigated by 15 prairie visits, 20 terrace investigations and 27 badlands excursions. Two boat trips were made along the Red Deer River.

During the field trips, notes were made on birds and other animals seen or heard. Observations were made on general vegetation distribution and composition. Vascular plant voucher pecimens were collected and identified with the assistance of Dr. J. Kuijt. pecimens are deposited with the University of Calgary and University of ethbridge herbaria.

PARK ENVIRONMENT. Dinosaur ark is in the prairie region of Alberta, pproximately 48 km northeast of Brooks. The surface area is about 8800 a. Altitude varies from 610 m to 747 m and the Red Deer River flows from west to east through the park.

The park lies in one of the hottest nd driest regions of the prairie provinces. Situated on the boundary between moist and dry steppe, the mean annual precipitation is only 330 mm, of which 203 mm falls from May to September.[12] Summer temperatures in the region are high; an average of 55 days per year have a maximum temperature above 26°C. Local temperatures in the park are substantially higher due to microclimatic effects.

The park divides naturally into three physiographic regions: prairie, badlands, and river terrace (Fig. 1). Each region is characterized by distinct landform, vegetation and bird life.

About 15 percent of the park area is prairie. Surficial material is largely glacial till, with lesser areas of weathered bedrock, lacustrine material, and inactive sand dunes. Soils are predominantly solonetzic.[4]

Badlands occupy about 75 percent of the park. They consist of eroding claystones and sandstones of the Bearpaw formation. All the characteristic badlands features can be seen here: miniature pediments and fans, hoodoos, buttes and mesas, knife edge divides, a complex pattern of fluvial channels, and piping.[1] Soil horizon development is negligible.

The remaining 10% of the park consists of terraces formed by the confined meanders of the river.[13] These unique landforms are not purely terraces nor purely river floodplain. Deposition of sandy levees creates low lying areas qualifying as floodplain. Subsequent deposition of eroded

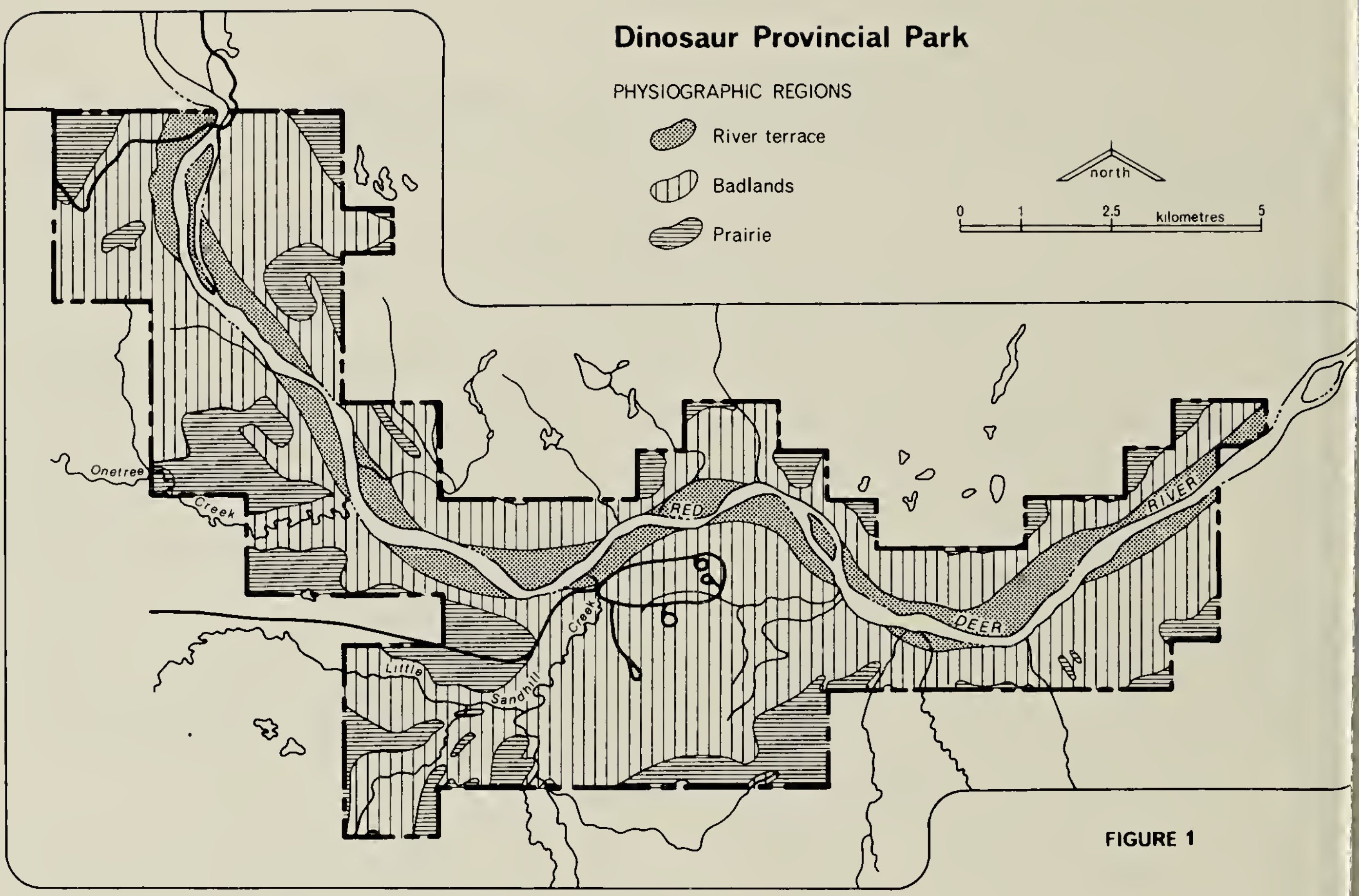


FIGURE 1

materials from the badlands and downcutting by the river has raised the older portions of the terraces sufficiently to place them beyond the reach of floodwater and therefore qualify them as terraces. Between the recently deposited levees and bona fide terrace is an area where old levees are still visible as ridges. This area is indeterminate in terms of matching the classical concept of terrace or floodplain.

Prairie vegetation is of the mixed grass type and is dominated by blue grama grass *(Bouteloua gracilis)*, June grass *(Koeleria cristata)*, and spear grass *(Stipa comata)*. Common forbs are wild onion *(Allium textile)*, pasture sage *(Artemisia frigida)*, cushion cactus *(Mamillaria vivipara)* and scarlet mallow *(Sphaeralcea coccinea)*. Prickly pear cactus *(Opuntia polyacantha)* is common in blow-outs. Little club moss *(Selaginella densa)* and broomweed *(Gutierrezia sarothrae)* are abundant in heavily grazed areas but, in general, the range has been well treated.

Badlands offer an intricate variety of vegetation types that appear to be strongly controlled by slope aspect, physical-chemical characteristics of the substrat
and fluvial process.

Characteristic plants of the barre
eroding slopes and pediments are: sever
species of saltbrush *(Atriplex* spp.
greasewood *(Sarcobatus vermiculatus*
rubberweed *(Hymenoxys richardsonii)*, b
sagebrush *(Artemisia cana)*, and narro
leaved sage *(Artemisia longifolia)*. Individu
plants are invariably widely spaced, wi
expanses of bare ground separating the
(Fig. 2)

Major northerly facing slopes and a
jacent valley bottoms frequently suppo
thickets of *Prunus* spp., saskato
(Amelanchier alnifolia), and roses *(Rosa* sp
with a luxuriant growth of mid-grasses a
forbs. Gentle southerly facing slop
support forb-rich grassland with varyi
amounts of sage *(Artemisia* spp.).

Larger pediments in the badlands zo
frequently show a sandy veneer and suppo
closed grassland vegetation with sandgra
(Calamovilfa longifolia) and ricegra
(Oryzopsis hymenoides). Characterist
forbs of these grassy areas are breadro
(Psoralea esculenta), Nuttall's ironpla
(Haplopappus nuttallii), small blue lupi
(Lupinus pusillus), and sunflowe
(Helianthus spp.). Very old pediments ha

vegetation similar to the nearby prairie grassland with blue grama grass *(Bouteloua gracilis)* being the dominant species.

Wide badlands drainage channels with a natural hydrologic regime have an intermittent moisture supply and extensive sand deposits. Typical plants are big sagebrush, sandgrass, yellow sweet clover *(Melilotus officinale)*, cocklebur *(Xanthium strumarium)* and alkali cordgrass *(Spartina gracilis)*. Scattered individuals of plains cottonwood *(Populus sargentii)* and thorny buffaloberry *(Shepherdia argentea)* are present.

Onetree Creek, Little Sandhill Creek and two smaller drainage channels are fed by irrigation runoff. These have virtually continual flowing water during most of the growing season. Vegetation reflects this improved moisture regime. (Fig. 3) Present are stands dominated by three-angled rush *(Scirpus americanus)*, cattail *(Typha latifolia)* and horsetails *(Equisetum* spp.). Tree and shrub cover is locally increased to the point that one can see small stands of plains cottonwood and a variety of shrub-dominated vegetation types. Monocultures of thorny buffaloberry *(Shepherdia argentea)* and of sandbar willow *(Salix interior)* are present, as are mixed stands of silverberry *(Elaeagnus commutata)*, rose *(Rosa* spp.), saskatoon *(Amelanchier alnifolia)* and chokecherry *(Prunus pennsylvanica)*.

The river terraces and point bar complexes support very distinct plant communities in accordance with the age of the deposits and the amount and type of sediments transported from the adjacent badlands. (Fig. 4). Recent sand deposits are colonized by species such as red goosefoot *(Chenopodium rubrum)*, sneezeweed *(Helenium autumnale)*, common plantain *(Plantago major)*, sandbar willow, and plains cottonwood *(Populus sargentii)*. With increasing age and height, tall, dense thickets of sandbar willow with a rapidly developing plains cottonwood understory appear. Successively older stands of plains cottonwood are present above the usual flood level. (Fig. 5). Shub cover is usually well developed and includes water birch *(Betula occidentalis)*, buckbrush *(Symphoricarpos occidentalis)*, dogwood *(Cornus stolonifera)*, thorny buffaloberry *(Shepherdia argentea)* and the vine, western clematis *(Clematis ligusticifolia)*.

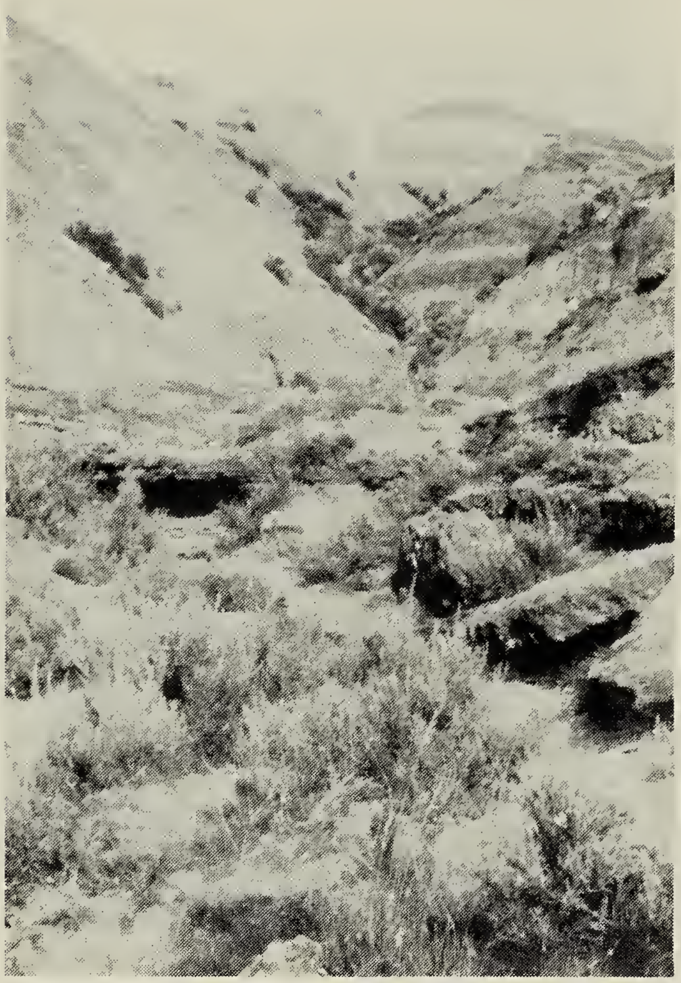


Fig. 2: Typical badlands vegetation dominated by open plant communities.

Above these treed areas and subject to deposition by sediment eroded from the badlands occur the sagebrush flats dominated by big sagebrush. Also present here are greasewood, western wheat grass *(Agropyron smithii)*, sand grass, giant wild rye *(Elymus cinereus)*, and poverty weed *(Iva axillaris)*.

ANNOTATED LIST OF BIRDS. This list is based on observations by N. Kondla in 1971, sporadic observations by N. Kondla and H. Pinel from 1966 to 1970, Randall from 1943 through 1945, observations by C. Wallis in 1975 and 1977, observations by C. Wershler in 1977, and Taverner at his camp, July 19 — September 26, 1917.[14 17] Species of which nests or young birds were seen are indicated by **. Species suspected of breeding in the park by virtue of birds being present in suitable habitat during the usual breeding season are indicated by *.

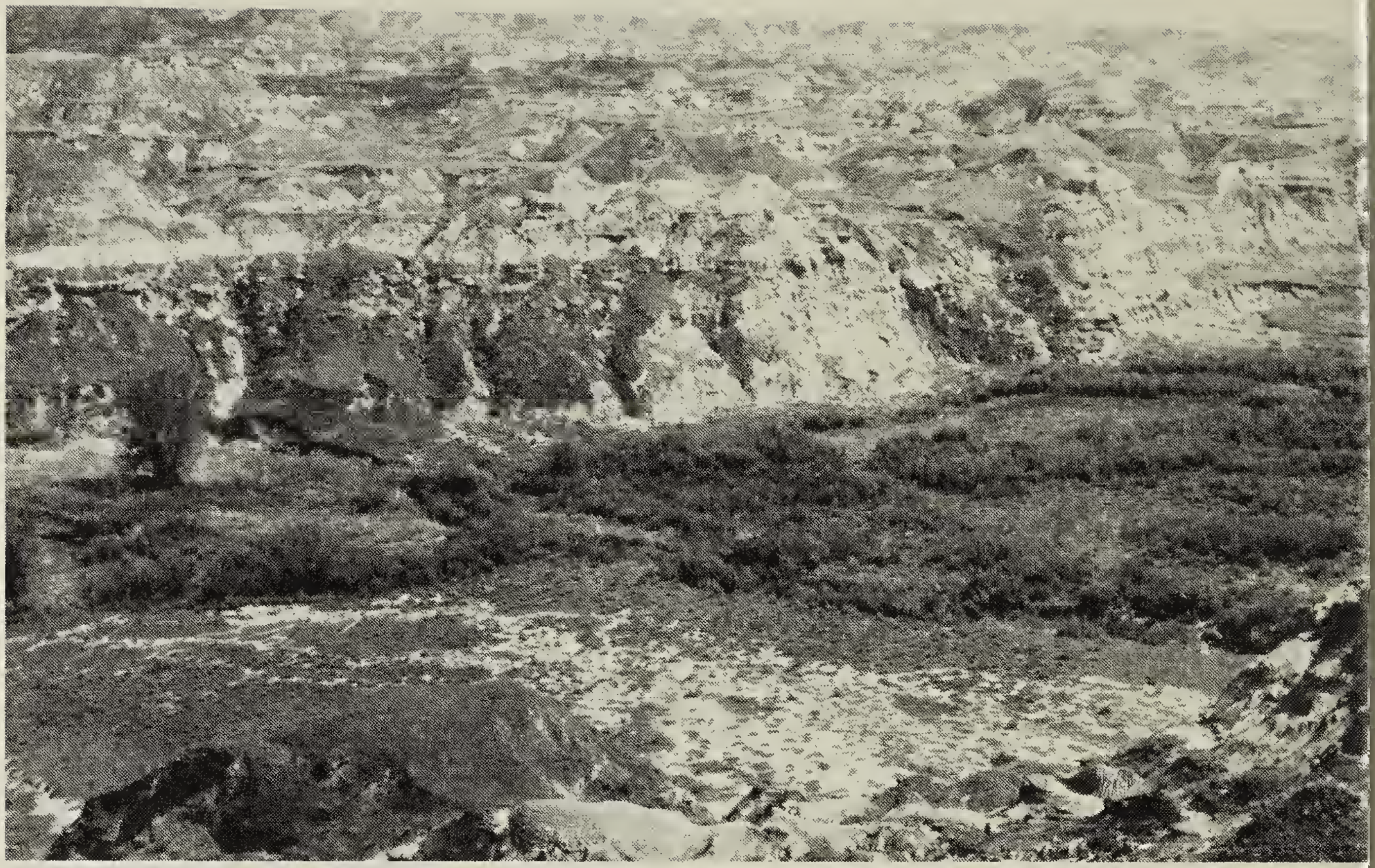


Fig. 3: Valley of Little Sandhill Creek showing the enriched shrub growth due to irrigati activity in the region.

Horned Grebe — Visitor during summer and migrations; no suitable nesting habitat; two birds reported during late summer, 1917, by Taverner.

Western Grebe — One bird was seen on the river at the administration site on July 15, 1971.

White Pelican — Taverner reported one bird June 24.

****Great Blue Heron** — Recorded by Taverner and also by Randall who stated that they may nest along the Red Deer or Bow Rivers.[17] [14] On June 24, 1971, a colony on an island in the Red Deer River near the western edge of the park was examined. It contained 41 nests, most with young almost ready to fly, in 9 large old cottonwoods. Vermeer reported 32 nests in this colony in 1967.[19] Adults were often seen in small groups along the river in 1971. Colony still active in 1975.

American Bittern — Taverner reported one bird on August 22, 1917.

****Canada Goose** — Adults were occasionally seen flying along the river and over the badlands. On June 7, 1971, goslings were seen leaving an old Ferruginous Hawk nest on a cliff.[6] On July 22, 1971, 34 flightless birds were seen in a group on the river. Some birds dove as our boat approached while others ran into the willo on shore. Dzubin indicates that this speci is widespread as a breeding bird along th lower Red Deer River.[2] Adults with you were seen on quiet river channels May 27 28, 1975.

Snow Goose — One bird in 1917.

***Mallard** — Seen occasionally along th river and Little Sandhill Creek.

****Pintail** — Seen a few times on the riv and the upper reaches of Little Sandh Creek. Also reported in 1917.

American Green-winged Teal — Flyi young seen on August 15 and 23, 1917.

Blue-winged Teal — Seen June 18, 1971, Little Sandhill Creek. Also reported August 24, 1917.

American Wigeon — Seen June 18, 1971, Little Sandhill Creek.

Northern Shoveler — Reported on Augu 17 and 18, 1917.

****Common Goldeneye** — A moultin flightless bird was seen on the river on Ju 22, 1971. Kondla and Pinel report a fema with downy young just outside the par indicating the possibility of nesting with the park.[8] At least four pairs seen May 27 28, 1975, on the Red Deer River.

Bufflehead — Two birds reported Se tember 14, 1917.

Turkey Vulture — Taverner "saw aggregations of a dozen to twenty a number of times" in 1917. H. Sandgathe (pers. comm.) told of having seen a few birds every year until about 1968.

Gowhawk — One bird July 30, 1917.

Sharp-shinned Hawk — Several specimens were collected between August 27 and September 7, 1917, and they were "numerous" after mid-September of that year.[17]

Red-tailed Hawk — One bird was seen on June 23, 1971 just inside the southeastern park boundary. From 1943-45 a few pairs nested along this part of the Red Deer River.[14]

****Ferruginous Hawk** — Taverner referred to this species as being very common. Randall also considered it to be a common nesting species in these badlands, 1943-45.[14] More than 119 nests were found throughout the badlands in 1971, indicating a long history of presence in the area. In spite of this, the breeding population appeared to be quite low and only two breeding pairs were confirmed by finding occupied nests in 1971. Two additional localities with hawks present indicated probable nesting sites. One of the occupied nests contained four eggs on May 20, four downy young on June 8 and was empty on July 1. The other occupied nest contained three downy young. Although it is difficult to say exactly why this species is presently so uncommon, it is perhaps significant that only one Richardson's Ground Squirrel was seen in the park in 1971.

****Golden Eagle** — Only two birds were seen in the park in 1971 but the author and H. Pinel have observed a pair nesting here from 1966-1970. Randall also reported a nesting pair.[14] Another nest site was located in 1971 and J. Fryberger showed the author a nest near his home that has been used annually for the past 20 years. One adult was seen May 27, 1975, near Fryberger's and 1 on May 28 at east boundary hunting along the south slopes of valley.

Marsh Hawk — Taverner reported that the species became common in late summer, probably on migration. There is very little suitable habitat for the species in the park. Only three birds were seen in 1971.

****Prairie Falcon** — Taverner secured eight specimens along Little Sandhill Creek in 1917 and Randall considered this species to be common, from 1943 through 1945.[17] [14] Their status has apparently not changed. In 1971, four breeding pairs were confirmed by observing the young in the eyrie. An additional six localities were noted with suitable nesting sites and adult falcons present. Tavener reported young had left two nests by July 19, 1917.

Peregrine Falcon — Randall referred to it as a common summer resident, nesting along the Red Deer River.[14] The fifth A.O.U. Checklist of North American Birds listed Deadlodge Canyon as a breeding site. As no birds were seen in 1971 despite intensive searching, it is likely that this species no longer nests in the park. It is not clear whether or not the species was present in 1917.

****Merlin** — Thirteen birds were collected in late summer and early fall, 1917. H. Pinel (pers. comm.) found a nest with six eggs on May 19, 1969. At least three pair nested in the park in 1971. With one exception birds were never seen far from the cottonwood stands along the river. Approximately one bird was seen per mile of river from Steveville to Jenner in 1975. Also common further downstream.

****Kestrel** — Taverner found the species to be common in 1917 but made no specific references to birds in the park area. Birds were seen on six occasions in 1971 including a pair with two young on the wing on July 22.

***Sharp-tailed Grouse** — Four birds were collected between July 27 and September 13, 1917. Four birds were seen in a sagebrush area on June 3, 1971.

***Ring-necked Pheasant** — A few males were seen in May and birds heard occasionally thereafter. The species was not as abundant as one would expect, considering the proximity to a pheasant hatchery and an area noted for its fine pheasant hunting.

Sora — Reported by Taverner from an area that may well have been outside the present park boundary since only intermittent sloughs occur within the park.

***Killdeer** — Taverner recorded five birds on August 23, 1917. Birds were fairly common on the prairie but were never seen along the river or even the most extensive level areas in the badlands.

Common Snipe — Several specimens were collected on August 16, 1917.

***Long-billed Curlew** — Birds were seen occasionally on the prairie in 1971. Nested along western boundary in 1977 (Wershler).

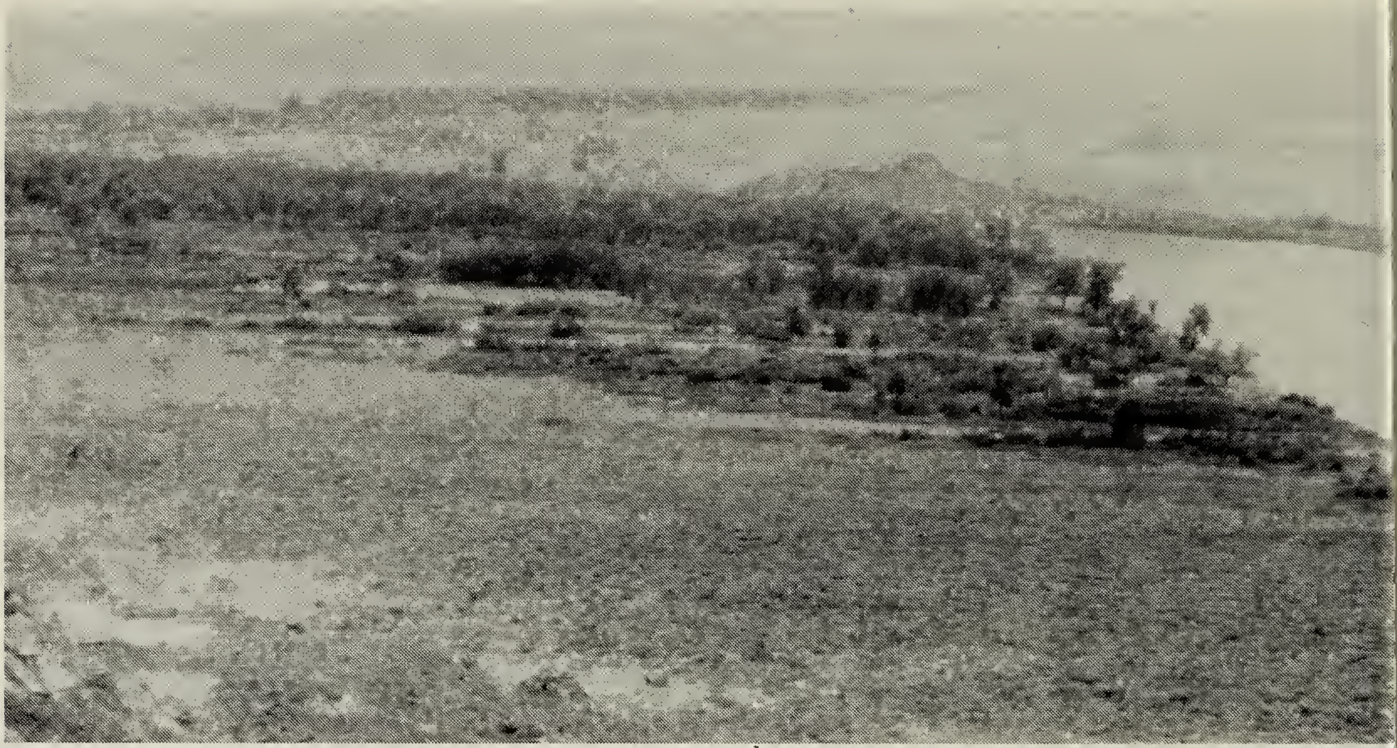


Fig. 4: Well developed vegetation zonation on river terrace and point bar complex. Not sharp habitat boundaries.

Upland Sandpiper — One was seen in rich *Stipa-Koeleria* grassland on July 28, 1971.

***Spotted Sandpiper** — Birds were regularly seen along the river. Also reported nesting there by Taverner and by Randall.[17] [14]

Willet — Seen only twice in the park but frequently on the prairie outside the park. Taverner reported three birds on the river in 1917.

Greater Yellowlegs — Three birds were seen along the river on August 11, 1971.

American Avocet — One bird was observed along the river on July 13, 1971.

Marbled Godwit — Infrequently seen on the prairie in the park.

California Gull — Regularly seen in small numbers along the river and flying over the prairie.

Wing-billed Gull — Status similar to California Gull. On June 7, 1971, one bird was feeding at the small dump near park headquarters.

Franklin's Gull — One bird was collected on July 27, 1917. In 1971, birds were seen circling over the badlands on June 29.

Common Tern — Two were seen along the river downstream from the Steveville Bridge in 1971.

****Rock Dove** — Seen frequently in the badlands where nesting was confirmed. It is noteworthy that Taverner did not record this species in 1917.

****Mourning Dove** — A common species in all habitats. Two nests were found in the badlands; one on a small ledge of a low clif and the other on a small hoodoo. Taverne saw only one bird and considered th species "not very common" in 1917.

***Great Horned Owl** — Taverner collecte one bird. Birds were seen in the badlands o two occasions in 1971 and one bird was see by the author along Little Sandhill Creek i April 1966. Present in cottonwoods in 197 and 1977.

Short-eared Owl — Seen occasionally o the prairie and also reported for 1917.

***Saw-whet Owl** — Wallis and Wershle discovered one bird calling on territory Ma 12, 1977. Photographed by Wershler.

***Common Nighthawk** — Seen frequentl over the river terraces and badlands. O July 4, 1971, 15 to 20 birds were observe circling over the park headquarters shortl before a rainstorm. An aggregation of 25-3 birds was observed by Wershler on Augus 12, 1977.

Belted Kingfisher — One bird was seen Jun 8, 1971, at Berry Creek. Taverner remarke on the scarcity of the species along the Re Deer River and attributed it to th murkiness of the water.

***Common Flicker** — A common inhabitan of the cottonwood stands along the river. I was frequently seen feeding on the groun in badlands.

****Downy Woodpecker** — First reports b Wallis and Wershler in 1977. Cottonwoo tands.

*Eastern Kingbird — A fairly common nhabitant of cottonwood stands and areas f taller shrubs along drainage channels. averner's latest date was September 7, 917.

Vestern Kingbird — Reported by Taverner ut, surprisingly, no birds were seen in 1971 nd none have been reported subsequently.

***Say's Phoebe** — A very common nhabitant of the badlands. One occupied est was discovered.[5] Also reported as 'quite common" in 1917 and as nesting in he 1943-45 period.[17] [14]

raill's Flycatcher — Taverner considered he specimens collected on August 9 and 11, 917, as early migrants. I do not know if hese specimens are Willow or Alder lycatcher although the latter is more likely.

Least Flycatcher — A common nesting pecies in the cottonwood stands along the ed Deer River, Little Sandhill Creek and netree Creek. "Common" in 1917.

Western Wood Pewee — Specimens ollected from August 6 to 25, 1917. None ere recorded in 1971 although this was kely due to observer oversight. This species ccurs regularly in the extensive cot- nwood stands downstream from the park Vallis). Reported in riverine woods by Vallis and Wershler in 1977.

***Horned Lark** — Fairly common on the rairie but rarely seen in the badlands. One est with three eggs was found May 27, 971. Young found them "common" and ollected them until September 20, [1917].[17]

***Bank Swallow** — A common species seen ost often along the river. Apparently ommon until the end of July, 1917. The umerous sandy cutbanks along the river rovide suitable nesting sites and several lonies were found.

Rough-winged Swallow — Very noticeable ong the small streams in the badlands. robably also present along the river but no fort was made to identify this species nong the numerous Bank Swallows ually present. Not reported for 1917.

***Barn Swallow** — A scarce species seen nly at park headquarters where it nested n buildings. Although several old nests ere found in the badlands it appears that e species no longer nests in that habitat. A few each day until September 25 (1917)."

***Cliff Swallow** — An abundant but obtrusive species nesting in the badlands nd on cliffs along the river. Twelve active conlonies were found and numerous old nests were observed. Old nests were seen to provide nesting sites for Mountain Bluebirds and House Wrens. Last date in 1917 was August 11.

****Black-billed Magpie** — A common species. Most nests were seen in the thorny buffaloberry, this shrub offering excellent protection for the nests. Taverner reported that they invariably nested within 100 yards of a Red-tailed or Swainson's Hawk nest.

****Common Crow** — Not as abundant as the magpie but regularly seen. Large flocks were reported in 1917 after mid-September.

***Black-capped Chickadee** — Occasionally seen in the cottonwood stands and also reported in 1917.

Red-breasted Nuthatch — Young collected one on August 21, 1917. Several birds on August 18, 1977 (Wallis).

****House Wren** — A common species found in a variety of habitats. Nests were found in a stump, deserted building, natural cavity in sandstone and an old Cliff Swallow nest. Also reported in 1917.

***Rock Wren** — A very common and characteristic nesting species of the badlands. Both Randall and Taverner also reported it as such. The latest date was September 15, 1917.

***Catbird** — An uncommon nesting species in areas of tall shrubs. Reported by Taverner as "fairly common."

****Brown Thrasher** — An occasional species of tall shrub areas. A nest with four eggs was found on May 31, 1971. Last date in 1917 was September 1.

****Robin** — A rather uncommon species restricted to the wooded areas during the breeding season. A nest with three eggs was found on May 31, 1971. Reported by Taverner as "common."

Hermit Thrush — Taverner reported one bird collected on September 22, 1917.

Swainson's Thrush — Taverner collected one bird collected on September 17, 1917.

***Veery** — A singing bird on July 15, 1971 indicates the possibility of nesting in cottonwood stands. Not uncommon downstream to the Saskatchewan border (Wallis).

***Mountain Bluebird** — One of the most common birds of the badlands. Randall and Taverner also reported this species.[14] [17]

Ruby-crowned Kinglet — Taverner reported a specimen on August 29 and occasional birds seen from the end of August until September 26, 1917 when the expedition

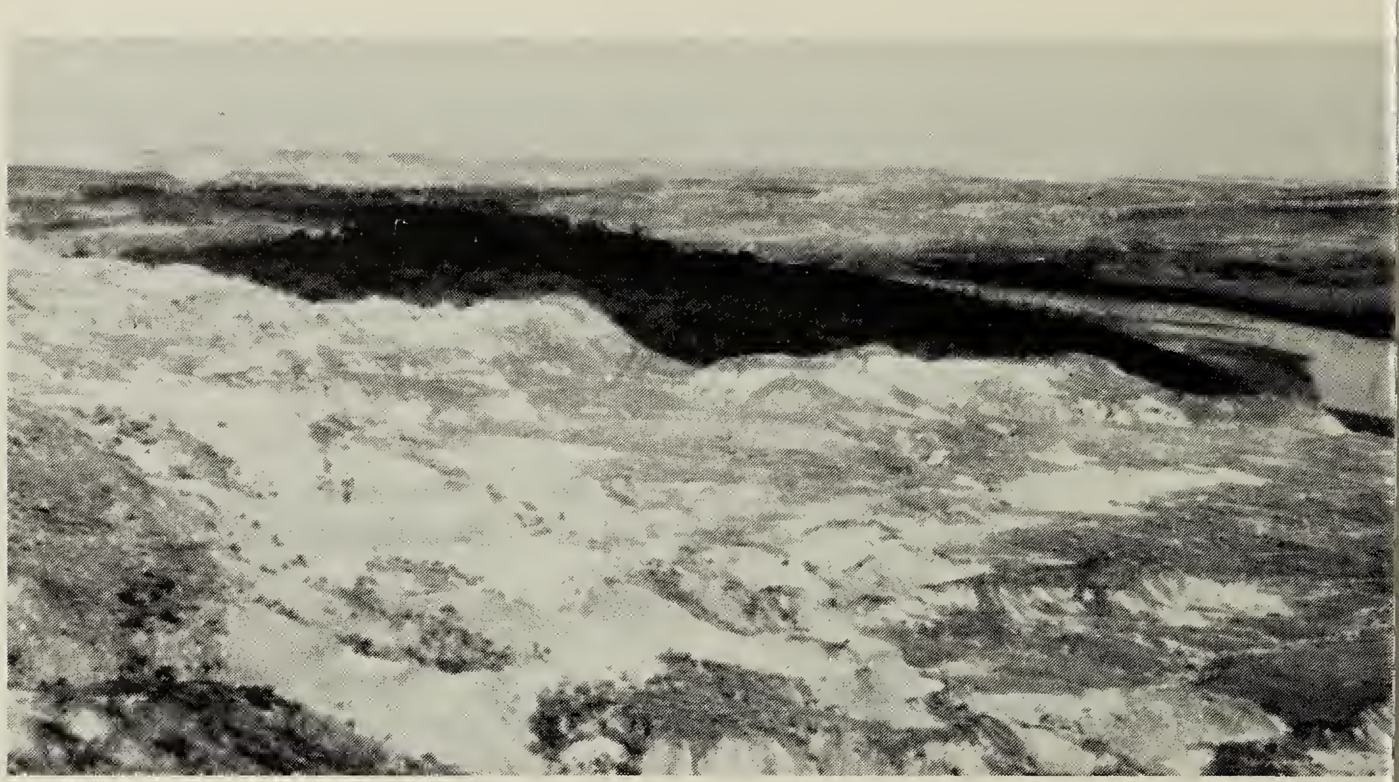


Fig. 5: Large stand of cottonwood and less rugged badlands.

ended.

Water Pipit — Taverner reported large flocks from September 12 to 17, 1917.

***Sprague's Pipit** — A common species on the prairie. Seldom seen but regularly heard. Taverner reported a single specimen on September 13, 1917.

***Cedar Waxwing** — An uncommon species of the cottonwood stands. Specimens were collected on July 20 and August 14, 1917.

Loggerhead Shrike — Taverner reported one or two families reared and two specimens July 21 and 28, 1917. In 1971 birds were seen near the park but not in the park.

***Starling** — A rare species in the park. Only a few birds were seen at a recently abandoned farmhouse.

Solitary Vireo — Six birds were seen on September 1, 1917; one was collected.

***Red-eyed Vireo** — Reported by Taverner from August 20 to September 1, 1917. Present in cottonwoods in 1977 (Wallis). Apparently overlooked in 1971.

***Warbling Vireo** — Taverner reported a specimen on August 16, 1917. Present in cottonwood stands in 1977. (Wallis). Apparently overlooked in 1971.

Black and White Warbler — Taverner reported sight records and the collection of two specimens between August 13 and September 1, 1917.

Tennessee Warbler — Specimens collected on August 13, 15, and 21, 1917. Also seen by Wallis on August 18, 1977.

Orange-crowned Warbler — Occasional birds seen and taken between August 25 a
September 17, 1917.

***Yellow Warbler** — Farily common in lo
and tall shrub habitats. Taverner report
birds to be most common from August 9
September 8, 1917, with September 17 as t
last date.

Magnolia Warbler — Taverner report
only two birds, both collected on Septemb
1, 1917.

Yellow-rumped Warbler — Tavern
reported several collections and numero
sightings from August 23 until at lea
September 18, 1917. In 1971, one bird w
seen May 10. All reports refer to the easi
recognizable subspecies *Dendroi*
coronata coronata (Myrtle Warbler).

Black-throated Green Warbler — Tavern
recorded a single bird collected on Augu
17, 1917.

Blackpoll Warbler — Taverner reported t
collection of two specimens on Septembe
and a sight record August 28, 1917.

Palm Warbler — Young saw two birds
September 1, 1917.[17]

Ovenbird — Taverner recorded t
collection of two birds, on August 27 a
September 1, 1917.

Northern Waterthrush — Taverner report
sight records and specimens during the la
week of August, 1917. Also seen August 1
1977 by C. Wershler.

Mourning Warbler — Young took o
specimen August 17, 1917.

***Northern Yellowthroat** — Tavern

ported this species to be fairly common e last week in August, 1917. Frequently en in 1971 in low shrub vegetation and verine shrubs.

ellow-breasted Chat — Salt reports its resence in the extreme western portion of e park in the vicinity of the now nonxistent town of Steveville.[16] In 1971 a bird as seen only on July 8. The species seems be present in small numbers, although is may only be a manifestation of its ffinity for thickets of thorny buffaloberry here it has subsequently been reported ith regularity by others.

ilson's Warbler — Taverner reported llections and numerous sightings from ugust 21 to September 18, 1917.

merican Redstart — Taverner reported a ecimen August 17 and sightings between ugust 26 and September 6, 1917. Also ported by Wallis and Wershler in August, 77.

ouse Sparrow — Only a few birds were en around park headquarters.

Western Meadowlark — Common on the airie in 1917, but only in late summer. In 71, this was one of the most abundant and iquitous species in the park.

llow-headed Blackbird — Taverner corded one bird.

Red-winged Blackbird — On July 6, sting birds were observed in an irrigation d drainage channel.

orthern Oriole — In 1971, the Baltimore riole *(Icterus galbula galbula)* was fairly mmon in the cottonwood stands. verner saw only two orioles and both re Bullock's Oriole *(Icterus galbula llocki)* collected August 29, 1917.

Brewer's Blackbird — A large migrant ck appeared in mid-September, 1917. irly common in 1971. Nine nests were und in 2 acres of *Shepherdia* and *Armesia.*[8]

Brown-headed Cowbird — Taverner ported one specimen August 2, 1917, and nsidered it to be generally "rather arce." Fairly common in 1971. Eggs were und in 4 of 9 Brewer's Blackbird nests.[8] ufous-sided Towhee was also parisitized.

estern Tanager — Young saw a few ound the last of August and first of ptember, 1917.[17]

se-breasted Grosbeak — Taverner orted single birds August 19 and 20, 1917.

ack-headed Grosbeak — Young felt that it s "not uncommon" during August, 1917; one collected on August 11.[17] This species is not known to breed along the Red Deer River.

Purple Finch — Taverner reported one to five birds daily between August 18 and September 7, 1917. Also reported by Wallis and Wershler in August, 1977.

Pine Siskin — Single birds were seen August 15 and 22, 1917. Also reported by Wallis in August 1977.

***American Goldfinch** — Young reported large flocks in early September, 1917.[17] Fairly common in 1971.

Red Crossbill — Taverner took a specimen July 21, 1917. It is interesting to note that Red Crossbills are quite regular in cottonwood stands of southern river valleys during summer (Wallis). Reported in park by Wershler August 12, 1977.

****Rufous-sided Towhee** — This species was common in 1917 and so it was in 1971 in treed and shrub areas. Two nests were found.

Savannah Sparrow — Reported by Taverner to be scarce in August but numerous late in September. Not seen or heard in 1971 although I had expected to encounter it.

***Grasshopper Sparrow** — One singing male in a sagebrush flat June 18, 1977 (Wallis).

LeConte's Sparrow — Occasional sight records and specimens reported by Taverner.

****Vesper Sparrow** — Common in 1917. Fairly common in 1971 with apparent preference for escarpment preference for escarpment edges.

****Lark Sparrow** — Fairly common until August 17, 1917. One of the most abundant and characteristic birds of the badlands and sage flats in 1971. Seems to favor sagebrush/woodland or tall shrub edges.

Dark-eyed Junco — Migrants arrived on September 17, 1917.

Chipping Sparrow — Quite common until the first week of September, 1917.

***Clay-colored Sparrow** — Reported as common by Taverner. Fairly common in 1971 in areas of low shrubs.

***Brewer's Sparrow** — Noted with certainty only on July 6, 1971, in a sage brush flat. Subsequent observations by Wallis and Wershler indicate that this species is scarce along this section of the river. It is more common downstream on more extensive sagebrush flats (Wallis).

White-crowned Sparrow — A common species after September 3, 1917. Also seen by Wershler on May 12, 1977.

White-throated Sparrow — Young found small numbers after August 22, 1917.[17]

Lincoln's Sparrow — Young did not see them until after August 25; they grew more common and were "very numerous" on September 5, 1917.[17]

***Song Sparrow** — Reported as common by Taverner. Only recorded once in my field notes and apparently uncommon in 1971. In sandbar willows, occasional on May 27 and 28, 1975.

***Lapland Longspur** — Taverner reported them from September 10 to 15, 1917.

***Chestnut-collared Longspur** — One on July 26, 1917; fairly common September 10-13 and no more until two on September 20. Birds were occasionally seen in 1971 on the prairie.

DISCUSSION. The known park avifauna consists of 130 species, 64 of which nest regularly. The remainder are migrants (43 species) and visitors from surrounding areas (17 species). Additions will consist largely of prairie species that breed in surrounding areas and migrants. The riparian tree and shrub habitats are attractive to migrating passerines and some migrating shorebirds are certain to use the river shores.

The breeding birds of Alberta consist roughly of one-half passerine species and one-half non-passerines (with a slight preponderance of passerines). The breeding avifauna of the prairie region of Alberta (exclusive of the Cypress Hills and elements introduced by the coniferous forests of the middle Red Deer River) is also roughly 50:50, with non-passerines having a slight preponderance in this instance. In the case of Dinosaur Park, the ratio of regularly breeding passerine to non-passerine species is almost 2 to 1. Thus, even at a very general level the birds of the park are not representative of either provincial or prairie avifauna.

Playing a minor role in the breeding park avifauna are aquatic birds such as grebes, most ducks, gulls and shorebirds. This can be attributed to a general lack of suitable habita
resulting from the prime reason for th
establishment of the park. The par
boundary was established primarily t
include the fossil-rich badlands whic
contain virtually no natural aquati
habitats. The small areas of prairi
within the park only contain smal
ephemeral wetlands incapable c
supporting a regularly breedin
aquatic avifauna.

The regularly breeding park bir
are dominated by aerial insectivoro
and seed-eating passerines. Thes
however are not representative
prairie grasslands. Rather, the
represent the distinct avifauna
riparian and badlands habita
characteristic of certain of the larg
streams in southern Alberta. Despi
small differences related to i
complete knowledge and th
geographic range of certain specie
the park avifauna is similar to th
reported from similar habitats alo
the middle Red Deer River, the Mi
River canyon area and even a porti
of the Missouri River breaks
Montana.[11 10 21 20]

The park supports species from 8
the 12 passerine "Bird Faunas" prese
in Canada as described by Udvardy
These are Black-capped Chickadee
the Boreal Forest Fauna; Le
Flycatcher, Veery and Vesper Sparr
of the Eastern Ecotone Fauna; N
thern Oriole, Brown Thrasher, Catbi
and Red-eyed Vireo of the Easte
Deciduous Forest Fauna; Spragu
Pipit and Chestnut-collared Longsp
of the Prairie Fauna; Western Wo
Peewee of the Western Conifero
Forest Fauna; Western Meadowla
and Brewer's Blackbird of the Weste
Woodand Edge Fauna; Say's Phoe
Black-billed Magpie and Mounta
Bluebird of the Great Basin Fauna; a
Rock Wren of the Trans-Tehuantep
Montane Fauna. The breeding pa
avifauna is dominated by species wi

eastern and southern affinities. Situated just east of an area identified as having an extremely high Index of Faunal Change, relatively few representatives of northern and western faunas manage to reach the park area.[3]

Human activity, both locally and on a continental level, has contributed to changes in the park avifauna. The Ring-necked Pheasant, Rock Dove, Starling and House Sparrow have only begun using the park since Taverner's visit in 1917. The Turkey Vulture and Peregrine Falcon no longer occur regularly. This can be attributed to the demise of the bison and the advent of pesticides, respectively. The Western Kingbird, Black-headed Grosbeak, and *bullocki* subspecies of the Northern Oriole have not been recently reported. Rising suggests that the *bullocki* species range has been depressed to the south during the past century, possibly due to climatic changes.[15] Climatic changes may also help account for the absence of the Black-headed Grosbeak. The absence of the Western Kingbird is puzzling and may even be a temporary phenomenon resulting from regional population fluctuations. The numbers of Mourning Dove have increased and the Ferruginous Hawk has apparently decreased since 1917. Reasons for these changes are not clear, although increased grain crops and reduced ground squirrel populations may be partial explanations.

The decimating effects of the House Sparrow and Starling on Mountain Bluebird populations is known from numerous localities. In contrast, the Mountain Bluebird has survived well in the badlands of Dinosaur Park and other badlands areas of southern Alberta. The Red-winged Blackbird is now present as a breeding species due to habitat changes triggered by irrigation. This has led to the valleys of One Tree Creek, Sandhill Creek and two unnamed streams receiving an unnaturally abundant infusion of water during the past 50 years. Aquatic vegetation has developed and riparian shrubbery has expanded to the point where breeding bird populations have been substantially altered.

Redwinged Blackbird *Fred W. Lahrman*

Of the three physiographic regions, the river terrace region supports the greatest variety of bird species and the highest populations per unit area. This is probably due to the variety of nesting substrates as well as the relatively high plant productivity which increases seed and insect food sources. Colonies of Bank Swallows capitalize on the sandy cutbanks for nest sites while Northern Yellowthroats occupy the sandbar willow thickets on the younger portions of the terraces. Cottonwood stands are frequented by species such as the Least Flycatcher, House Wren, Common Flicker, Eastern Kingbird and Merlin. The tall shrub ecotone between cottonwood stands and sagebrush flats is home to species such as the Brown Thrasher, Rufous-sided Towhee, Yellow Warbler, and Lark Sparrow. Sagebrush flats are used as foraging sites by a number of species but the most regular nesting species dependent on this habitat are the Brewer's Sparrow and Grasshopper Sparrow.

Vegetation and landform variation in the badlands is on a micro-scale, thereby failing to provide minimum areas needed for certain species. For example, Horned Larks were not found nesting in the badlands although grassland habitat is abundant — in small, scattered areas. The most abundant and characteristic species of the badlands are the Mountain Bluebird, Rock Wren, Say's Phoebe and Lark Sparrow.

The prairie region, with the least variation in land form and vegetation structure, supports the fewest numbers of birds and species. Typical species are the Horned Lark and Chestnut-collared Longspur.

[1] CAMPBELL, I. A. 1970. Erosion rates in the Steveville badlands, Alberta. Canadian Geographer 9:202-216

[2] HANSON, H. C. 1965. The Giant Canada Goose. Southern Illinois Univ. Press. 226 pp.

[3] KAISER, G. W., L. P. LEFKOVITCH, and H. F. HOWDEN. 1972. Faunal provinces in Canada as exemplified by mammals and birds: a mathematical consideration. Canadian Zool. 50:1087-1104

[4] KJEARSGAARD, A. A. 1972. Soils of the Dinosaur Provincial Park. Alberta Inst. of Pedology, Report No. M-72-4, 3 pp.

[5] KONDLA, N. G. 1972. Use of Barn Swallow nests by phoebes. Calgary Field Nat. 3:158-159

[6] KONDLA, N. G. 1973. Canada Goose goslings leaving cliff nest. Auk 90:890

[7] KONDLA, N. G. and H. R. CRAWFORD. 1971. An ecological survey of Dinosaur Provincial Park. Parks Planning Branch, Alberta Department of Lands and Forests. Unpub. Rep. 82 pp. + 17 maps.

[8] KONDLA, N. G. and H. W. PINEL. 1971. Some noteworthy records of cowbird parasitism in Southern Alberta. Blue Jay 29:204-207.

[9] KONDLA, N. G. and H. W. PINEL. 197 Breeding records of 19 species of birds i southern Alberta. Blue Jay 31:153-157.

[10] KONDLA, N. G., H. W. PINEL, C. WALLIS, and C. R. WERSHLER. 197 Avifauna of the Drumheller are Alberta. Canadian Field Nat. 87:377-393

[11] KONDLA, N. G. and W. W. SMITH. 197 An ecological survey of Dry Islan Buffalo Jump Provincial Park. Park Planning Branch, Alberta Department c Lands and Forests. Unpubl. Rep., Volume I, 55 pp.

[12] LONGLEY, R. W. 1972. The climate of th Prairie Provinces. Environment Canad Atmospheric Environment, Climatological Studies. No. 13, 79pp.

[13] McPHERSON, H. J. 1969. Flow, chann and floodplain characteristics of th lower Red Deer River, Alberta. pp. 25 279 in Nelson, J. G. and M. J. Chambe (ed.). Geomorphology. Methuen, 399 pp

[14] RANDALL, T. E. 1946. Birds of the Easter Irrigation District, Brooks, Albert Canadian Field-Nat. 60:123-131.

[15] RISING, J. D. 1973. Morphologic variation and status of the orioles, *Icterus galbula, I. bullockii,* and *I. abeill* in the northern Great Plains and i Durango, Mexico. Canadian J. of Zoo 51:1267-1273.

[16] SALT, W. R. 1973. Alberta vireos and woo warblers. Prov. Mus. and Archives c Alberta, Publ. No. 3. 141 pp.

[17] TAVERNER, P. A. 1919. The birds of th Red Deer River, Alberta. Auk 36:1-2 248-265.

[18] UDVARDY, M. D. F. 1963. Bird faunas c North America. Proceedings Interna Ornith. Congr. 13:1147-1167.

[19] VERMEER, K. 1969. Great Blue Hero colonies in Alberta. Canadian Field-Na 83:237-242.

[20] WALCHECK, K. C. 1970. Nesting bir ecology of four plant communities in th Missouri River breaks, Montana. Wilso Bull. 82:370-382.

[21] WALLIS, C. A. 1976. Milk River Canyo resource evaluation. Parks Planning an Design Branch, Alberta Recreatio Parks and Wildlife. Unpubl. Rep. 122 pp

1977 BIRD OBSERVATIONS IN THE CARIBOU MOUNTAINS, ALBERTA

E. OTTO HOHN, Dept. of Physiology, University of Alberta, Edmonton, T6G 2H7
and D. V. WESELOH, Dept. of Ornithology, Royal Ontario Museum, Toronto.

In continuation of field work previously reported in the *Blue Jay* (1975, 33:73-86, 1976, 34:56-58 and 116-117) we visited Rock Island Lake July 23 to 26 and Margaret Lake July 26 to 29, 1977. Our main objective was to find evidence of breeding for Gray-cheeked Thrushes and Northern Phalaropes. However, our visit was evidently too late in the season, for no phalaropes or thrushes, not even robins, were seen.

Our findings in regard to Red-throated Loons were also disappointing. We found no loons on the two small lakes which had a nest each in 1976. On the other hand, several sightings of these loons fishing in Rock Island Lake and flying off carrying a fish, presumably to smaller breeding lakes, indicated that there had been some successful nesting. Five Red-throated Loons were seen in a group at the east end of Margaret Lake and two apparent pairs were seen on two small lakes near the west end of this lake, an area not previously visited by our parties.

Circumstantial but not conclusive evidence of breeding of Mew Gulls not yet found nesting in Alberta, was obtained at a small lake near Margaret Lake. Here two pairs of these gulls had dived at us with much calling in late June, 1976, suggesting they were breeding although no nest with young could be found. This year we found a young Mew Gull, already able to fly, on July 26 at the same place.

When Weseloh revisited the lake that evening there was also an adult which dived and screamed at him, but did not associate with the juvenile.

In earlier reports on this area the possibility that Greater Scaup may nest there was raised but a downy duckling collected on Margaret Lake in late June, 1976, was identified by W. E. Godfrey as a Lesser Scaup, and a female with a brood, taken on a small lake near there on July 27, 1977, also proved to be of this species.

BIRDS NOT PREVIOUSLY RECORDED IN THE AREA

SHARP-SHINNED HAWK: one was seen in flight and perched at a small lake near Rock Island Lake on July 24.

SEMI-PALMATED PLOVER: one shared a strip of sandy beach on Rock Island Lake with three Least Sandpipers for a few hours on July 24.

SHORT-EARED OWL: no owls had previously been observed, although feathers of the Great Horned Owl were found in two years (and were again found this year). On July 27 we saw a Short-eared Owl flying over a small lake near Margaret lake where it was at times mobbed by a Common Tern.

HAWK OWL: on the morning of July 26 a Hawk Owl flew about 20 feet above the ground over our campsite on Rock Island Lake and then perched on a spruce about 150 yards away for a brief period.

DOWNY WOODPECKER: the only woodpecker previously recorded was the Common Flicker but on the evening of July 25 a Downy was seen on the shore of Rock Island Lake.

NORTHERN THREE-TOED WOODPECKER: a male was collected near Margaret Lake on July 27.

RED-BREASTED NUTHATCH: As we were leaving the Fishing Lodge on Margaret Lake on July 23 one of us heard the unmistakable calls of one of this species.

PINTAIL PARASITIZING SNOW GOOSE NEST

R. R. CAMPBELL, Dept. of Zoology, University of Guelph, Guelph, Ontario and
E. BOORMAN, Dept. of Biology, Queen's University, Kingston, Ontario

On May 27, 1975, an active Snow Goose *(Anser caerulescens caerulescens)* nest containing two Snow Goose eggs and one Pintail *(Anas acuta)* egg was found on the La Pērouse Bay Snow Goose colony located 30 km east of Churchill, Manitoba. The nest was situated near the edge of a small (0.5 ha) delta island in the Norton River, this being one of the last vegetated islands of the foreshore flats. Lime grass *(Elymus arenarius mollis)* and willow *(Salix sp.)* were the predominant vegetation.

The nest was examined daily for three days after the initial observation, and by May 30, 1975, contained four Snow Goose eggs in addition to the Pintail egg. Subsequent observations at intervals of two days until June 7, 1975, revealed that all five eggs were being incubated (incubation commenced May 29 or 30) and that the male Snow Goose was defending the nest territory. The nest was examined intermittently from June 7 to 22, 1975, when we found evidence that the Pintail egg had hatched and that the remaining three eggs had been abandoned (one egg had been collected June 7, 1975, as part of a research project). Examination of the remaining eggs indicated that all were fertile and very close to hatching when abandoned. On June 23, the male and female Snow Geese were observed with the duckling in the vicinity of the abandoned nest. No further sightings were made of this "family."

Four other Snow Goose nests were situated on the island, the closest being some 20 m distant. No eggs of other species were found in these or, with one exception, (see below), in any of the other Snow Goose nests studie on the colony. No Pintail nests wer found in the immediate vicinit although others were found on island further from the coast on a brackis lagoon. These were smaller island with more willow cover and such nest were usually hidden among th willows.

One other Snow Goose nest con tained one Common Eider *(Somateri mollisima sedentaria)* egg. Also on Canada Goose *(Branta canadensi interior)* nest was found containin four Canada Goose eggs, one Commo Eider egg and a Snow Goose egg. Th nests were within 10 m of each othe an an eider nest was discovered withi 3 m of the Canada nest. Two othe eider nests were located about th same distance from the Snow Goos nest on an adjoining island. Willo and lime grass were the predominat vegetation. No further examination o these nests was made until late July, b which time all nests were empty. Ther was no evidence of hatching o predation.

Weller cites instances of Pintail laying eggs in the nests of Canad Geese, Mallards *(Anas platyrhyncho* and Redheads *(Aythya americana)*.[6] N instances of Pintails laying eggs i Snow Goose nests appear to have bee reported in the literature. Dum nesting and intra-species parasitis have been reported for both Sno Blue Geese and the Canada Goose.[3] [5] Canada Geese have also been reporte to lay eggs in the nests of Mallards and in the nests of Osprey *(Pandio haliaetus)*.[2] [4] [1] The American (Commo Eider has layed eggs in the nests of th Herring Gull *(Larus argentatus)* and it own species.[6] In the case of the eider it would not seem too surprising to find this species parasitizing nests of other species when nests are in close proximity. Fred Cooke and associates have found this to be a fairly common occurrence in the La Pérouse Bay colony (pers. comm.). Weller has indicated that of all non-obligate parasites, waterfowl *(Anatidae)* are most noted for laying eggs in the nests of other birds.[6]

We thank Murray C. Smith and Robert Milne of the University of Guelph for helpful comments on the manuscript, and Fred Cooke of Queen's University for his help and cooperation on the project of which this paper is a by-product. Funds for the project were provided by Canadian Wildlife Service, Canadian National Sportsmen's Show, Wildlife Society and the National Research Council of Canada.

[1] BENT, A. C. 1925. Life histories of North American wild fowl. Part 1. U.S. Nat. Mus. Bull. 126: 244 pp.

[2] BOYER, R. L. and M. J. PSUJEK. 1975. Canada Goose parasitizing Mallard nest. Wilson Bull. 87(2):287.

[3] COOCH, F. G. 1961. Ecological aspects of the Snow-Blue Goose complex. Auk. 78:72-89.

[4] FANNIN, J. 1894. The Canada Goose and Osprey laying in the same nest. Auk. 11:332.

[5] PREVETT, J. P. and L. S. PREVETT, 1973. Egg retrieval by Blue Geese. Auk. 90(1):202-204.

[6] WELLER, M. W. 1959. Parasitic egg laying in the Redhead *(Aythya americana)* and other North American Anatidae. Ecol. Monogr. 29:333-365.

A pair of Pintail drakes *Fred W. Lahrman*

MID-MARCH SINGING BY AMERICAN ROBIN AND VARIED THRUSH IN SOUTHWESTERN ALBERTA

MARTIN K. McNICHOLL, Department of Biological Sciences, Brock University
St. Catharines, Ontario L2S 3A1

The winter of 1976-1977 was one of unusual weather patterns throughout North America.[6] This resulted in many unusual records of birds and bird activity all over the continent.[11] Debate as to whether these weather events were exceptional, or are part of marked new changes continues,[6] and thus unusual and changing natural phenomena apparently associated with them should be carefully documented. In Alberta the winter was exceptionally mild, resulting in several records of active insects in February![7 9 13] Elsewhere, I have described the behaviour of Bohemian Waxwings "hawking" insects in the proposed Kananaskis Provincial Park, Alberta.[7] In this note, I document two records of early singing in thrushes in the same general area.

In the early morning of March 12, 1977, Jim R. Salt, Alan N. Wisely and I watched an American Robin singing from the top of a pine near the ranger station for about 15-20 minutes. At 0930 on March 13, Wisely and I observed a singing Varied Thrush perched on top of a fir near the outlet channel from Lower Kananaskis Lake. Neither species had been seen previously on several trips to the area over the winter and neither was seen subsequently.

Early dates of arrival for the mountainous part of Alberta are scarce in the literature. In contrast to their winter distribution 20 years ago, American Robins are now frequently found in winter in the prairie provinces even though most migrate.[12] East o the mountains in Calgary, arrival date ranged from February 3 to March 3 from 1961 to 1970, but more recen compilations of arrival dates fo Calgary omit this species, or stat "wintered".[1 3 4 5 8 10] The usual arriva date for the Kananaskis is unknown but there is a March 20, 1964 date fo Banff, to the north.[10]

Winter records of Varied Thrush i Alberta are much scarcer. Boothma reported one at a Calgary feeder o February 1, 1975, citing this as th second winter record for the city.[2] Th species also wintered there in 1977. Sadler and Myres stated that Varie Thrushes arrive in the mountains i April.[10] Mountain arrival records nea the Kananaskis include Banff record of April 19, 1965 and May 20, 1973, Cadomin record of April 24, 1972, an a Lake Louise record of May 4 1976.[1 3 8 10]

Thus, the Varied Thrush, an probably the American Robin appea to be early records for the moun tainous parts of Alberta. The fact th both birds were singing is especiall noteworthy.

These observations were obtaine while we were employed by Peregrin Research & Documentation Ltd conducting vertebrate surveys for th Alberta Parks Branch.

[1]ANONYMOUS. 1972. Dates of first ol servations of spring migrant birds in th

Calgary area — 1972. Calgary Field Nat. 3:164-165.

BOOTHMAN, H. 1975. Observations of a Varied Thrush. Calgary Field Nat. 6:277-278.

BUTOT, R. 1975. Dates of first reports of spring migrant birds in the Calgary area 1975. Calgary Field Nat. 7:126-130.

BUTOT. R. 1976. Dates of first reports of spring migrant birds in the Calgary area 1976. Calgary Field Nat. 8:72-75.

BUTOT, R. 1977. First sightings of spring migrant birds in the Calgary area — 1977. Calgary Field Nat. 9:121-127.

CANBY, T. Y. 1977. The year the weather went wild. National Geographic 152:798-829.

McNICHOLL, M. K. in press. Bohemian Waxwings flycatching — *in* February. Alberta Naturalist.

[8]O'KEEFE, S., and V. LANG. 1973. Dates of first reports of spring migrant birds in the Calgary area — 1973. Calgary Field Nat. 5:51-56.

[9]REIST, J. D. 1977. Early insect records in the city of Edmonton: 1977. Alberta Naturalist 7:190-194.

[10]SADLER, T. S., and M. T. MYRES. 1976. Alberta birds 1961-1970. Provincial Mus. Alberta Nat. Hist. Section Occ. Paper No. 1. iv + 314 pp.

[11]SMITH, K. 1977. The changing seasons. American Birds 31:292-301.

[12]SPEIRS, J. M. 1953. Winter distribution of Robins east of the Rocky Mountains. Wilson Bull. 65:175-183.

[13]THORMIN, T. 1977. Spring weather, butterflies, owls, etc.: a request. Edmonton Nat. 5:67.

merican Robin *Fred W. Lahrman*

VARIATIONS IN BIRD NESTING HABITS

JEAN BANCROFT, 264 Campbell Street, Winnipeg, Manitoba R3N 1B5

From observations I have made during recent years, it would appear that variations may be taking place, not only in the materials used by some birds to build their nests, but also in their nesting sites. This thought has occurred to me as a result of my bird-watching at Whytewold, Manitoba, on Lake Winnipeg, 40 miles north of the city of Winnipeg.

Formerly and still largely, the common materials used are grasses of various types, twigs of all kinds, leaves, shreds of bark, and cotton from poplar seeds; all these being produced by nature herself.

Today, however, birds are picking up materials not previously available to them. For example, I have observed that in addition to the natural materials, the following are now being used: plastic, wood shavings, strands from binder twine and string, bits of kleenex tissue, pieces of cloth, curly clumps of hair from a poodle dog, and cotton fluff from clothes dryers.

Examples from different nests are as follows:

American Robin. 1. Nest of grasses and small twigs, reinforced with mud. A four inch piece of kleenex tissue hanging down on the front of the nest. **2.** Grass fibres, twigs, mud, some paper and rag woven in. **3.** Grassy nest with cloth woven in and a long, one inch wide piece hanging down from nest. Another nest with green plastic hanging down.

Catbird. 1. Nest of twigs and grasses, with a piece of strong plastic near top and at front of nest, acting as a screen. **2.** Twigs, string, plastic pieces.

Yellow Warbler. 1. Plant fibres, very thin strips of plastic, thin strands from binder twine, and string. **2.** Silke strands from tent caterpillars, plan fibres, string. **3.** Base of nest a clump o tangled white string; grass and plan fibres. **4.** Plant fibres, wood shaving string.

Traill's Flycatcher. 1. Plant fibres an grasses, much cotton fluff on outsid of nest, and some kleenex hangin down. **2.** Little clumps of white curl poodle hair woven in with grass an plant fibres.

Northern (Baltimore) Oriole. 1. Ne finely woven of grasses, fine stran from binder twine. Lined with pieces fluffy cotton from clothes dryer. Grasses, plant fibres and woo shavings. **3.** Plant fibres, silken stran from tent caterpillars, plastic stri approximately 1/8 inch wide. **4.** Ne woven of 1/8 inch plastic strips a lined with fibrous material. Variati in shape in that it was more cup-li and not as deep. Nest built on bou of oak tree, overhanging a drivewa This nest was confirmed as Baltimore's by H. Copland and Pr Sealey of the University of Manitoba had difficulty observing the nest b realized the bird was an oriole of so kind.

Our **Traill's (Alder) Flycatcher's** ne higher than reported: **1.** Twelve feet in a crotch of a tall, thin ash tree. Fifteen feet from the ground on horizontal branch of an oak tree. Approximately 15 feet from the grou on a horizontal branch of an oak tre From what I could observe this m have been the same bird which h built and started to sit on a nest in Saskatoon bush, 12 feet from t ground. That nest had been disturb and then I observed a new nest bei built nearby in the oak.

ERRATA AND ADDENDA

SASKATCHEWAN CHRISTMAS BIRD COUNTS: A 35-YEAR REVIEW (PART I)

by Wayne E. Renaud and Guy J. Wapple. *Blue Jay* 35(4):224-239.

P. 225. Table 1. First footnote should ead "Based on *920* counts."

P. 227-228. Table 2. The second column of Pintail should read *24* "counts"; the third column (frequency "rank") should then read *52*³ for Pintail, American Coot and Red-winged Blackbird, and *55* for Brown Creeper. Also frequency "rank" should ead *57*³ for Mute Swan, Canvasback and Common Mesganser, and *60*³ for Whistling Swan, Hawk Owl and Western Meadowlark. Remarks under Oldsquaw should read "1st Saskatchewan *specimen* record"; and under American Coot should read "All Regina except *one each* at Gardiner Dam and Ft. Qu'Appelle." The high count for American Kestrel should ead *1;* the date of the Skull Creek observation should read *27/59.*

P. 232. On the distribution map for Willow Ptarmigan, each of the lower hree degree blocks containing obervations should be moved south one block.

In addition to the 127 species ecorded on Christmas counts published in the *Blue Jay,* two additional species, Red-tailed Hawk and Northern (Baltimore) Oriole, have been eported in counts published in *Audubon Field-Notes. In both intances the counts appeared in the Blue Jay* and *Audubon Field-Notes,* but the *Blue Jay* did not list the species.

The Red-tailed Hawk was listed as an additional species on the Regina Christmas count in 1970 *(Am. Birds 25(2):15).* The Northern Great Plains Region report for the winter period *(Am. Birds 25(3):593)* stated that an immature male was seen at distances down to 15 feet on December 28, 1970. The observation was omitted in error from the results of the Regina count forwarded to the *Blue Jay* Christmas count editor, Mary Houston (pers. comm.) and hence was not listed in the *Blue Jay.* The observation was, however, within count period and therefore brings the total number of species reported in the province during count period to 128 species.

The Northern (Baltimore) Oriole was listed as an additional species on the Yorkton count in 1953 *(Aud. Field-Notes 8(2):56).* The oriole was banded by C. Stuart Houston (pers. comm.) on December 17, 1953 at a bird feeder where it had been present for the previous three weeks; it was not, however, observed after December 17, and, since count period that year did not begin until December 25, should not have been included.

RECOVERY OF BANDED PEREGRINE FALCON

S. O. Jordheim, RR #1, White Bear,
Saskatchewan S0L 3L0

On August 28, 1977, Grant Smith of Langley, B.C., found the dry carcass of a Peregrine Falcon, with carrion beetles on it, in a cattle feeder on the farm of Glenn Smith, near Sanctuary, Saskatchewan (northeast quarter of section 19, township 23, range 15, west of 3rd meridian). It carried a plastic band on one leg and a subsequent search disclosed an aluminum band on the other leg drawn up tight against the bird's body. On the blue plastic band were large letters, AK7, while the aluminum band bore number 617-

02475.

The cattle feeder had been cleaned on July 15 and the bird was not there then, so it probably died later in July.

I mailed the bands to Dr. Stuart Houston in Saskatoon, who reported them to the Canadian Wildlife Service in both Ottawa and Edmonton. Harry Armbruster of the C.W.S. office, Edmonton, promptly phoned Dr. Houston with the exciting news that this falcon had been raised in Dr. Tom Cade's captivity breeding program at Cornell University and had been "hacked out" at an artificial nest site in New Hampshire on July 17, 1976, by Dr. F. Prescott Ward.

It did not apparently return to its hacking site, as several others have done, but chose to wander more than 1800 miles west, only to die when little more than one year old.

LARGE CONCENTRATION OF COMMON NIGHTHAWKS

Ken de Graff, Conservation Officer, Waboden, Manitoba, R0B 1S0

On August 8, 1977, at approximately 3:00 p.m., while returning from a trip to the Duck Mountains, my wife and I observed a unique spectacle on No. 10 highway about 20 miles north of The Pas, Manitoba.

We were driving along when suddenly we found ourselves in the middle of what appeared to be hundreds of darting, diving birds. I eased up on the gas pedal because we almost hit several of the birds which were flying only a few feet above the pavement. Large numbers of birds could also be seen a 100 feet or so above the ground.

Identification of the birds was easy due to the large numbers close to the car. The swept-back wings and prominent white wing patch were unmistakable. These birds we Common Nighthawks. Nighthaw feed heavily on flying insects b insect activity was not obvious a therefore, the reason for such a lar concentration is uncertain.

We proceeded a little farther nor and the commotion ended as sudden as it had begun. Although birds cou still be seen behind us in the rear vi mirror we were out of the flight.

Although I have watched and hea these birds on previous occasio usually in the evening over towns, have never witnessed such a lar concentration before, especially in t middle of the afternoon.

Common Nighthawk *R. E. Gehl*

WHITE-FACED IBIS AND CATTLE EGRET AT LITTLE QUILL LAKE

J. B. GOLLOP, Canadian Wildl Service, Saskatoon, Saskatchewan

Several times in August, 1977, Jo Totten of the U.S. Fish and Wildli Service saw up to seven Cattle Egre and up to four White-faced Ibises the Ding Darling project of Duc Unlimited at the southeast corner Little Quill Lake, Saskatchewan. T egrets were last seen on August 31 a the Ibises on September 1. Mr. Tott was familiar with both species in t United States.

WHITE-FACED IBIS AT LAST MOUNTAIN LAKE, SASKATCHEWAN

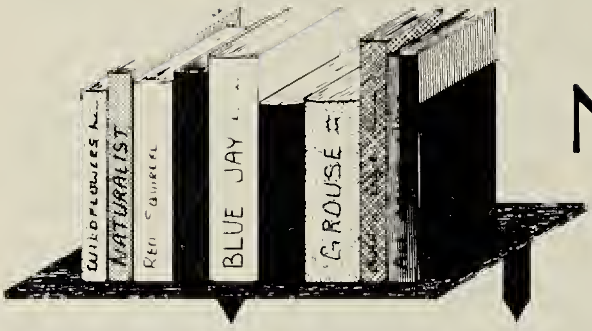
E. M. CALLIN, Box 186, Fort Qu'Appelle, Saskatchewan S0G 1C0

On May 15, 1977, Brad Mason, conservation officer with the Department of Tourism and Renewable Resources at Fort Qu'Appelle, and his wife Jan were birding at the north end of Last Mountain Lake. They were greatly puzzled by three strange, large birds near the shore. They watched them at about 50 yards for about 15 minutes before the birds flew and landed further away. When they referred to their Robbins' Field Guide they were satisfied that they had seen White-faced Ibis, and noticed the strange impression of the white faces. On their return, they phoned me to ask if it was possible. They did not know about Lahrman's observations in the same area in May and June, 1976 (*Blue Jay* 34:238).

COLOUR-MARKED PURPLE MARTINS

A large-scale, continent-wide Purple Martin colour-marking project was initiated in 1977. Observers are asked to look for and report any colour-marked (plastic leg bands and/or wing tags) Purple Martins. Please record the color of the bands or wing tags, which leg or wing they are on, age and/or sex (if either is known), where and when observed, and whether the bird was in a roost, staging flock, migratory flock or at a nest site (scouting or nesting?) We are especially interested in the movements of young birds and their return to the parent colony or nearby colonies. All reports will be acknowledged and should be sent to Ms. Kathleen Klimkiewicz, Bird Banding Laboratory, Laurel, Maryland 20811. U.S.A.

A June thunderstorm *Fred W. Lahrman*



NATURE LIBRAR

CAREX IN SASKATCHEWAN

JOHN H. HUDSON. 1977. Bison Publishing House, P.O. Box 7226, Saskatoon, Saskatchewan. 193pp. 8½x11 inches, soft cover. $10.00 + .50 handling.

Carex is, by far, the most successful genus of flowering plant in Saskatchewan. Many botanists would also add that its many species and varieties make it nomenclaturally the most interesting and challenging genus in the province. In this book, the first of its kind in Saskatchewan, Mr. Hudson describes the genus and discusses all the species of *Carex* known to occur in the province. He exhibits an intimate knowledge of *Carex* both in the field and in the herbarium.

The book begins with a general description of *Carex*. The unique features, including the perigynium, of this group of sedges are described and illustrated with carefully labelled drawings. The keys to separate sections and species, occupying 22 pages, are adapted from the monographic treatment of North American species of *Carex* by K. K. McKenzie (North American Flora, Vol. 18, pp. 1-478, The New York Botanical Garden. 1931-35). The main body of the book, pages 35-157 inclusive, contains the descriptions of Saskatchewan species and discussions of taxonomic problems,
habitats and distributions. There a
three pages of references, 13 pages
maps and 20 pages of photograph
The photographs show 40 differe
species preserved in the W. P. Fras
and in the J. H. Hudson herbaria. T
maps show with dots the know
distribution of 99 taxa of *Carex*
Saskatchewan. Each dot represents t
location of one voucher specim
studied by Mr. Hudson.

The distribution maps clearly i
dicate that some species are confin
to extreme northern parts of t
province. Some species have wi
distribution throughout the provin
but others are confined to t
southwest or the southeast. In the pas
Hudson explains, in order "to det
mine a Saskatchewan sedge one h
had to hop back and forth betwee
extralimital floras, a procedu
conducive to error." Hudson's bo
now brings together under one cov
all known species with ranges e
tending into our province; in this wa
he makes identification easier a
encourages additional study of t
ever-changing status of the nati
sedges of Saskatchewan.

Some species of *Carex* may in fa
no longer be present in the provinc
Hudson notes, for example, that *Car*
meadii "may now be extinct" withi
the boundaries of Saskatchewan. T

nly known collections were made by . Macoun in the File Hills in 1879 and y Macoun and Herriott at the base of py Hill in 1906. "Its habitat", Hudson ontinues, "appears to have been oist prairie, perhaps with tall gass pecies of grasses. This habitat has een much destroyed by farming and hat has escaped cultivation in this outheastern corner of Saskatchewan – the Aspen-Oak section of Rowe 959) — is very susceptible now to eing overrun by the aggressive inroduced pest, *Bromus inermis*". udson implies that more should be one to preserve native habitats in all arts of the province.

This book brings the nomenclature f *Carex* up to date but it does not troduce any new species or variety ames. It does, however, combine a umber of species. For instance, cKenzie distinguished the three ecies *festivella, microptera* and *achystachya* but Hudson drops these ames and includes all this material nder the more inclusive name *Carex acloviana*. I am hearily in favour of is move because all Saskatchewan aterial seems to fit into the one ecies description.

One small complaint: the book does t include an index. Since the species escriptions are arranged phabetically this would appear to esent no problem. If, however, a tanist has been in the habit of using species name now abandoned by udson (for example, *Carex festivella)*, must search for some time or run it rough the keys in order to find it.

Serious naturalist should acquire d use a copy of *Carex in Saskatewan*, for a careful study of the ok will enable them to identify any dge in this fascinating genus. eviewed by *G. F. Ledingham*, 2335 thol Street, Regina, Saskatchewan T 3G4

HOW TO CONTROL GARDEN PESTS WITHOUT KILLING ALMOST EVERYTHING ELSE

HELGA and WILLIAM OLKOWSKI. 1977. Rachel Carson Trust for the Living Environment, Inc., 8940 Jones Mill Road, Washington, D.C. 200015. 14pp.

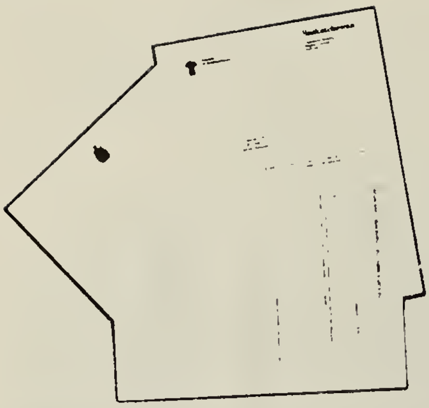
This booklet of 14 pages is based on an article that appeared in *Horticulture* in June, 1976. In a very simple way it presents the principles of garden ecology and discusses the possible alternatives to synthetic pesticides, with an explanation of the reason for not using pesticides. The authors are two research scientists working in the Division of Biological Control of the University of California at Berkeley.

It struck me that this booklet might have a use in the classroom. It would allow the presentation of a complex concept in a simple situation to which most children have ready access — the town or farm garden. By inference, a wider application of these simply presented "principles of garden ecology" could be made.

In spite of its simple approach, there is a measure of sophistication about this little booklet, with its lively cartoons from *Punch* and a quotation from Rachel Carson's *Silent Spring:*

> A truly extraordinary variety of alternatives to the chemical control of insects is available . Some are already in use and have achieved brilliant success. Others are in the stage of laboratory testing. Still others are little more than ideas in the minds of imaginative scientists, waiting for the opportunity to put them to the test. All have this in common: they are *biological* solutions, based on understanding of the living organisms they seek to control, and of the whole fabric of life to which these organisms belong."

— Reviewed by *Margaret Belcher*, 2601 Winnipeg Street, Regina, Saskatchewan.



LETTERS

YOU'RE NEVER TOO OLD!

If this money is late reaching you, please don't expire the subscription as I'm experiencing much trouble in getting my letters and such away in time; due to weather and drifted lane; (Jan. 9/78) we're still on the farm (retired). I've been a subscriber to the Blue Jay from its inception.

I've been feeding such a flock of chickadees, a nuthatch and woodpeckers that I can't get any more suet. I have to buy sunflower seeds and peanuts, so it's been expensive but they have to be fed, regardless.

We're old age pensioners of 82 and 91 (the last is my husband's age) so we're finding it difficult in a winter like this. — *Mrs. Harold J. Bray,* Box. 32, McLean, Saskatchewan S0G 3E0

BIRD FEEDING TRAY AT FENTON

We live in the hamlet of Fenton, half a mile from the Fenton Ferry. The grain elevator and the little railway siding building have been removed.

We have 10 or 12 Evening Grosbeaks that come daily to our feeding tray. As the days get longer, they come a few minutes earlier each day — today, January 23, they came at 8.25 a.m. They share the sunflower seeds, flax and gravel with up to 14 Black-capped Chickadees. I was thrilled and excited to find one grosbeak wearing a band. We had a Blue Jay yesterday. Pine Grosbeaks have been rather scar
here for 3 or 4 years, but we had o
yesterday and three on January
Birds are seldom frightened when t
train goes by.

The woodpeckers get along ve
well with the others — woven plast
bags of suet attract as many as five
six at a time — Downy and Hai
Woodpeckers both come, sometim
both species together. — *Mrs. Eslie
Weegar,* Birch Hills, Saskatchewan.

1931 MAGPIES

I read with interest Dr. Housto
account of the spread of the magp
back across Saskatchewan in t
1920's. This fits in well with my e
perience. In the winter of 1931,
caught a Black-billed Magpie in
weasel trap along the Battle Riv
about six miles north of Neilbu
Since we came from Holland
immediately recognized what it w
We took it home and fed it rabb
meat. Many neighbors came to vi
the bird, because most had not seen
magpie before. We released it in t
spring.

I remember that winter we were
hard up we lived on beans and ba
nock, tea and sugar. There was
tremendous snowshoe ha
population. We had a .22 rifle a
lived on one rabbit every day.

Part of the day we cut scrub at fi
dollars per acre. Towards evening t
rabbits came out of the bush to ch
the bark off the felled trees. We kep

od supply of rabbit meat on hand d hung the skinned and gutted rcasses on the trees. Only ickadees bothered them, as magpies re not yet in evidence. When we ade tea, we had to strain our snow ter carefully to sift out the rabbit llets, the rabbits were so numerous. *Hans de Vogel,* Box 219, Neilburg, skatchewan.

ONAPARTE'S GULL AT cOUAT LAKE

On August 28, 1977, I observed 14 naparte's Gulls at McOuat Lake, cally known as 'Goose Lake', 14 les north of Yorkton. Since I had no otographs of this species, and since was not listed in Houston's 1949 list the region (Can. Field-Nat. 63:215-1), I returned on the rainy Labour y weekend of September 4 and 5 d set up my blind at a quiet bay on east shore of the lake. I was able to tain the accompanying otographs.

I have since learned that the Anakas ve recorded flocks of up to 70 birds fall migration at Good Spirit Lake, s than 10 miles to the northwest. The ecies breeds in the northern half of province. — *Larry Morgotch,* 51 arleswood Crescent, Yorkton, skatchewan S3N 2R5

aparte's Gull *Larry Morgotch*

Bonaparte's Gulls *Larry Morgotch*

NOISY NIGHT FLIGHT OF CROWS

On the evening of April 1, 1978, having retired for the night, I was engulfed in a delightful blanket of sleep when suddenly the unmistakable call of a crow penetrated my brain. Crows wake me up every morning, even before the House Sparrows set up their usual din, so I now thought "Surely it can't be time to be wakened yet!" Opening my eyes, I discovered, to my great joy, it was still pitch dark — the time was 11:15 p.m. — but those crow calls! They were increasing in number and volume as the birds approached rapidly from the south, passing over our house and continuing northward. I attempted to count the calls and tallied 35 during a one-minute period. The birds were very noisy, perhaps even agitated. After three or four minutes their voices faded away in the distance. Normally crows are not night flyers. Had a "roost" been violently disturbed? If so, why were the birds flying directly north in a seemingly orderly, if noisy, flight rather than a helter skelter dispersement? I have no answer. Perhaps someone else can provide one. — *Patricia O'Neil,* 1125 Elliott Street, Saskatoon, Saskatchewan, S7N 0V4

MARKED WHOOPING CRANE

I received word from Aransas that the six Whooping Cranes that stopped near Neilburg for 20 days in October, 1977, arrived safely on the 9th of November. The group could be identified because of the banded juvenile. —*Hans de Vogel,* Neilburg, Saskatchewan.

NEW MAGAZINE

By the time this June *Blue Jay* reaches its readers, Pollution Probe will have published the first issue of Probe Post. The Probe Post will be a bimonthly publication aimed at a business and institutional audience. It will emphasize analytical presentation of news and issues related to energy and environmental matters, offering subscribers an understanding of the issues being raised and confronted by Probe and its allies as well as careful, original and concise accounts of trends and developments in our field. The Probe Post will be printed on tabloid size newsprint and will use a newpaper-like format. Subscriptions will be $20.00 annually for individuals and $30.00 for corporations and institutions.

Most of the contents of Probe Post will be produced by Probe staff. Nevertheless, we are actively seeking contributions (articles, columns, short pieces, updates, even feature reports) from other groups and experts, and we will be happy to receive unsolicited contributions.

In particular we will be including regular surveys of the current activities and concerns of environmental organizations across the country. In order to do this properly, we will have to rely on people like you to keep us informed of efforts by your group and in your area. So please help us to publicize your work by keeping us informed of your latest initiatives. -
Bob Gibson, Editor, Pollution Prob
University of Toronto. Toronto, O
tario M5S 1A1.

TRUMPETER SWAN SOCIETY CONFERENCE

The Trumpeter Swan Society w
hold its Sixth Conference in Alask
The papers, sessions and pan
discussions will be held at the A
chorage Westward Hilton on Se
tember 7, 8, and 9, 1978. On Septemb
10, 11, and 12, a field trip is bei
planned to observe Trumpeter Sw
habitat.

The Trumpeter Swan Societ
founded in 1968, is composed
conservationists, biologists, ar
citizens from across Canada, t
United States, and England who sha
a common interest in conservi
Trumpeter Swans and in restori
them to their former range. T
conference is being held this year
the state in which 80% of the worl
population of Trumpeter Swa
summer.

Anyone wanting additional
formation or wishing to participate
the conference please contact Dav
K. Weaver, The Trumpeter Sw
Society, P.O. Box 296, Maple Pla
Minnesota 55359, U.S.A.

CORRECTION

The photograph on page 215 of t
December, 1977 issue of the Blue Jay
misidentified as a Greenish Blue. It
actually an Arctic Blue *(Plebe*
aquilo rustica) as evidenced by t
presence of a small dark dot in t
center of the hindwings plus su
marginal dots at the base of the sa
wings.

SASKATCHEWAN NATURAL
HISTORY SOCIETY
BOX 1784, SASKATOON, SASKATCHEWAN S7K 3S1

OARD OF DIRECTORS

FFICERS

onorary President	Elizabeth Cruickshank	2329 Athol St., Regina S4T 3G4
esident	Maureen duWors	1220 Elliott St., Saskatoon S7N 0V6
st President	Ole Nielsen	327 Poplar Cres., Saskatoon S7M 0A8
ce-President	Lorne Scott	Box 995, Indian Head S0G 2K0
easurer	Betty Mundy	625 9th Ave. N., Saskatoon S7K 2Y6
rresponding Secretary	Barbara Shourounis	2325 Cornwall St., Regina S4P 2L4
cording Secretary	Pern Cordery	1 - 505 12th St. E., Saskatoon S7N 0H1

PPOINTED DIRECTORS

ue Jay Bookshop	Frank Brazier	2657 Cameron St., Regina S4T 2W5
ue Jay Editor	Gary W. Seib	2325 Cornwall St., Regina S4P 2L4
irculation	Jim Mundy	625 9th Ave. N., Saskatoon S7N 0V6
onservation	Lorne Scott	Box 995, Indian Head S0G 2K0
ndangered Species	James R. Jowsey	2635 19th Ave., Regina S4T 1X2
rasslands Park	George F. Ledingham	2335 Athol St., Regina S4T 3G4
cal Socities	Frank Switzer	1301 Shannon Rd., Regina S4S 5K9
ewsletter Editor	Pat Kern	1053 Chestnut St., Moose Jaw S6H 1A7
u'Appelle Valley	Mary Skinner	Box 777, Indian Head S0G 2K0
ecial Publications	C. Stuart Houston	863 University Dr., Saskatoon S7N 0J8
uth	Ron Andrews	843 Athabasca St. W., Moose Jaw S6H 2E2

PRESENTATIVES AT LARGE

ary Anweiler	2422 Montague St., Regina S4T 3K7
ans deVogel	Box 219, Neilburg S0M 2C0
ayne Harris	Box 994, Prince Albert S6V 5S5
avid Hatch	190 Rupert Ave., Winnipeg R3B 0N2
ary Houston	863 University Dr., Saskatoon S7N 0J8
O. Jordheim	R.R. #1, White Bear S0L 3A0
rne Lepp	11 Dogwood Cres., Yorkton S3N 2M6
ayne Lynch	1762 Kilborn Ave., Ottawa, K1H 6N2
ristine Pike	Box 117, Waseca S0M 3A0
ul Rump	3120 Rae St., Regina S4S 1S0
ank Scott	Box 190, Loon Lake S0M 1L0
an R. Smith	203 - 10883 Saskatchewan Dr., Edmonton T6E 4S6

RESIDENTS OF LOCAL SOCIETIES

rt Qu'Appelle	Dorothy Flemming	Box 933, S0G 1S0
dian Head	Lorne Scott	Box 995, S0G 2K0
oose Jaw	Catherine Letkeman	55-610 2nd. Ave. S.E. S6H 1B5
gina	James R. Jowsey	2635 19th Ave., S4T 1X2
skatoon	Andre Bouthillette	1810 Lorne Ave., S7H 1Y4
rkton	Lance Irvine	85 - 3rd Ave. N., S3N 1C2

MISS CHRISTINE MacDONALD
3045 ANGUS ST.
REGINA, SASK.
S4S 1P2

SASKATCHEWAN NATURAL HISTORY SOCIETY

Second class mail registration number 1046.
Please return unclaimed copies.
Return postage guaranteed.

Box 1784, Saskatoon, Saskatchewan
S7K 3S1

PRINTE
cent